October 6, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 63

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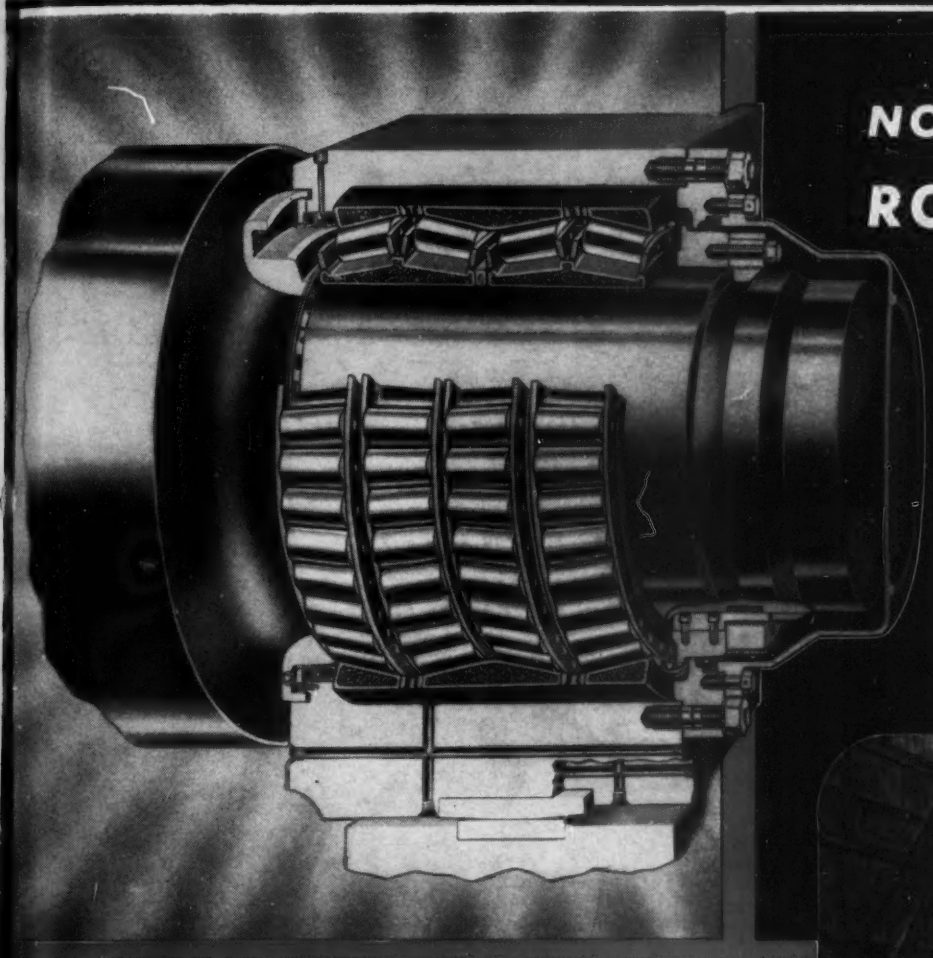


NOW YOU CAN HAVE
ROLLER BEARING
Performance
PLUS 50% - 60%
GREATER ROLL
NECK STRENGTH

No type of bearing used on mill roll necks has ever equalled the all-around efficiency, simplicity and economy of the roller bearing as designed and manufactured by The Timken Roller Bearing Company.

Timken Balanced Proportion Roll Neck Bearings assure 50% to 60% increased roll neck strength with correspondingly decreased roll neck stress and deflection. These bearings also show load ratings up to 40% higher than previous designs of tapered roller bearings. For specific information consult your mill builder or our roll neck bearing specialists. The Timken Roller Bearing Company, Canton 6, Ohio.

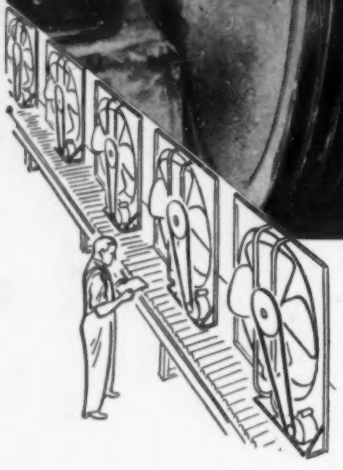
Painted for The Timken Roller Bearing Company by Peter Helck.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →◫←

One of a Kind

Powerful *Texrope* drive specially engineered for a large mill. This main driver sheave is 7 ft in diameter, has 30 grooves, transmits 1400 hp!



...or One of A THOUSAND!

EVERY TEXROPE DRIVE IS ENGINEERED FOR ITS JOB

YOU GET sound recommendations from Allis-Chalmers — recommendations backed by the greatest V-belt engineering talent and experience in the business.

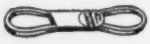
Allis-Chalmers originated the Multiple V-belt drive 22 years ago. Since then, *Texrope* engineers have designed many thousands of drives, ranging from fractional horsepower units for manufacturers of small compressors, pumps or washing machines—to the largest V-belt drives ever installed. They've served: Textile, Mining, Metal working, Petroleum, Chemical . . . in fact, *every* major industry.

Take advantage of this vast research and experience. Bring your V-belt problems to headquarters — for the best in engineering talent — for the most complete line of V-belt equipment made.

Service is as close as your nearest Allis-Chalmers dealer or office. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2239

Refer to Sweet's Catalog

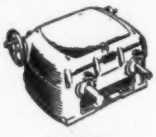
TEXROPE .. Greatest Name in V-Belt Drives



"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationary or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

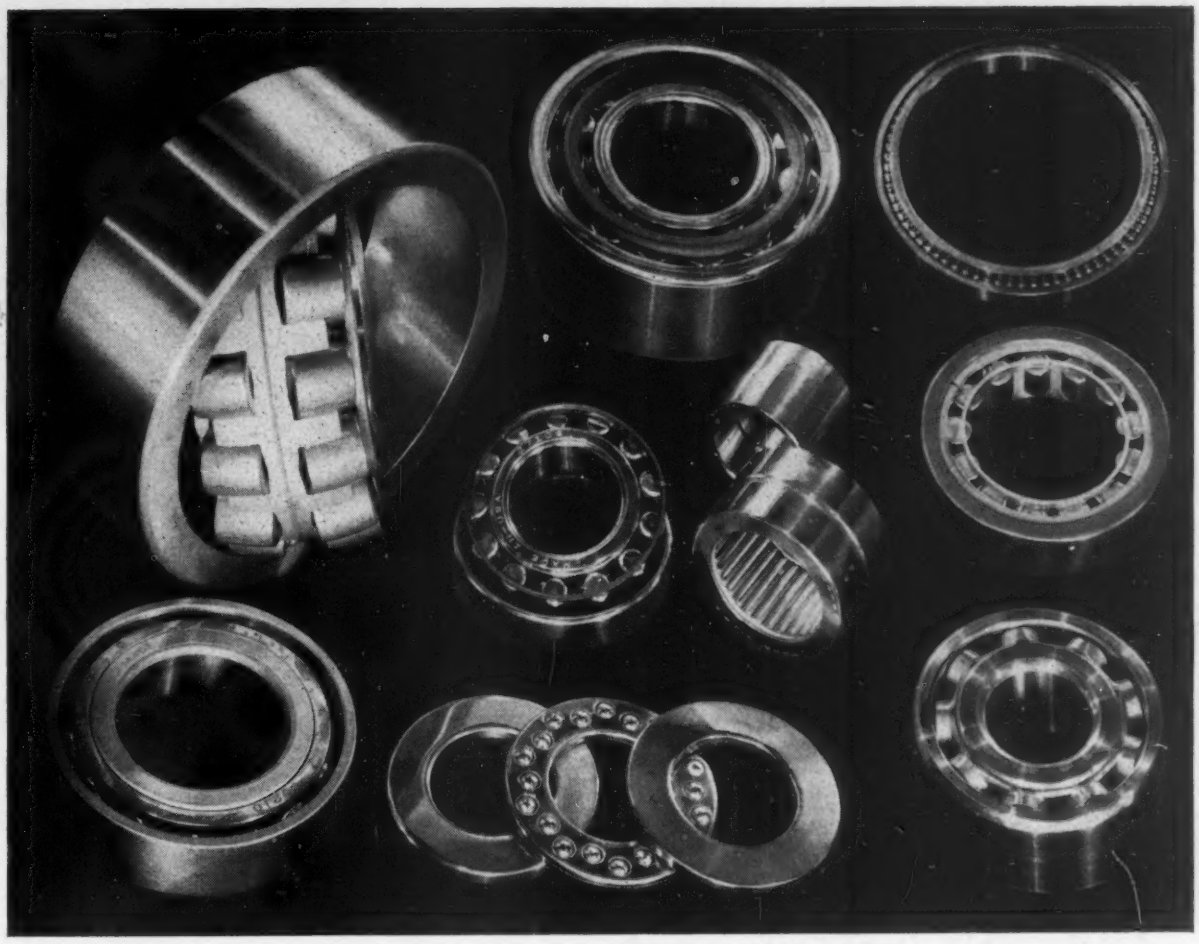
ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great



Anti-friction BEARING STEELS

There are no short cuts in the manufacture of high-grade bearing steels. The bearing industry sets standards and specifications that demand the highest degree of metallurgical skill combined with the most careful steel-making practices.

Bethlehem as an alloy-steel specialist has the skill and facilities to produce bearing steels that meet these rigid requirements. Among the important features of Bethlehem bearing steels are their internal cleanness and their closely-controlled analysis. Non-metallic inclusions are held to the minimum—microstructure and hardness are carefully controlled—all desired properties are assured in Bethlehem bearing steels through special mill procedures and testing methods.

Whether the manufacturer produces roller bearings or ball bearings, whether he uses an AISI 52100 type of steel or a low-carbon carburizing alloy grade, Bethlehem is in position to furnish the steel in the quality he needs.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ **BETHLEHEM ALLOY STEELS** ★

BETHLEHEM STEEL

aid the worker and increase production

INGERSOLL-RAND AIR TOOLS

GRINDERS
CHIPPERS
RAMMERS
HOISTS
IMPACT WRENCHES
DRILLS
CORE BREAKERS
AIR MOTORS
RIVETERS

The operating features of Ingersoll-Rand Air Tools make them extremely popular with the foundry men. You get—power regulation—durability—*more power per pound of weight*—trouble-free service and safety. In addition, each tool is backed by Ingersoll-Rand service in all industrial centers.

Our engineers are available to assist you in selecting the proper tool for the job...call them...make use of their experience.

COMPRESSORS
ROCK DRILLS • OIL & GAS ENGINES
PUMPS • BLOWERS

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 8-992

How water climbs a ladder

A typical example of B.F.Goodrich product improvement

AT SOME fires the water has to go high. Firemen have to draw hose up narrow ladders. And they have to do it in seconds.

Fire hose used to be heavy, bulky; it took too much strength and time to lift and carry; it wasted those precious seconds that often determine whether or not lives and property can be saved.

B.F.Goodrich, with more experience in fire hose design and making than any other company, set out to improve this old, standard product and came up with something almost completely new: a new way of twisting the cords to make them stronger; a new rubber compound that is lighter yet stronger, and lasts longer as well; a new way of weaving the cotton jacket that gives greater strength with smaller cords, and no weak spots; in fact, a new fire hose that is 18% lighter yet stronger than ever before; a hose that gets into action faster.

Just for good measure, they developed a new *Koroseal* gasket that can be tightened by hand — cuts coupling time in half, a new and stronger end construction near the coupling where failures used to be common, and a new treatment to prevent mildew.

This often happens at B.F.Goodrich when engineers set out to improve a "standard" product. That's why it pays to ask your distributor what new developments in rubber B.F.Goodrich has made lately in any products you may buy. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

Koroseal—Trade Mark Reg. U. S. Pat. Off.

B.F.Goodrich
FIRST IN RUBBER

Behind the Scenes...

More Shows Coming Up

Having hardly shaken the dust of the Machine Tool Show off our jeans, we're back at this convention business again. Back in Chicago again, too, where the good people are probably wondering who these characters are who have been cluttering up the loop for the past month. We know, though. They're executives, large and small, of the metalworking industry whose unerring sense of business has led them to the Windy City for an all-fall stand. This one, of course, is the National Metal Congress and Exposition, commonly referred to as the metal show, and as usual, we'll be on hand to greet you there, provide a place to meet your friends, relax, and catch your second wind. The editors have prepared a package in this week's book which will give you a slight indication of what's in store. You'll find all the important papers to be given at the sessions, a complete program of all the technical meetings, a floor plan showing location of all the exhibits, including ours which will be open and ready for you at space number 209. And if you were at the Machine Tool Show and want to know, we'll probably have a few of those big yellow envelopes on hand if you'd like same.

Paradise, At Last

We aren't sure just where this story comes from, but it's supposed to be true that there is a newly-discovered Paradise in the middle of the Pacific Ocean. Seems that on a small insular spot called Norfolk Island the government taxes only men between the ages of 21 and 55. The taxes are $10.80 per year, or if you can't afford that, you can work for nine days at the enormous rate of $1.20 per day and work them off. We're considering the possibility of establishing a charter plane service from the west coast, anticipating the day when millions of people will hear about the deal and decide to head for Norfolk.

Heavy Payloads

In these days of extreme demand and pressure for deliveries on all kinds of steel products, we have become somewhat accustomed to tales of herculean efforts aimed at securing necessary tons of steel to keep production lines rolling. None that we have yet heard of can match the one pulled the other day by the Kaiser-Frazer expediters, aimed no doubt at keeping that "car-a-minute" pace at Willow Run. At least nobody has yet matched it if we can believe the story we saw in the Detroit *News*. The item said, and we quote, "Three cargo planes ferried back and forth between Buffalo and Detroit today to deliver a rush order of 47,168 tons of steel to keep Kaiser-Frazer production lines in operation". Well, now, that sounds like a real big job. That much steel would require a dozen fully loaded freight trains to carry, and those planes probably were real busy. The story becomes even better when, further down, we note that they did it all in six flights! Gentlemen, the age of air transport is upon us. That's 7861 tons of steel per flight. Anybody around here seen the needle, Watson?

New Faces Dept.

Starting last week we are showing off our New Look. Not that we have joined the little below the knee club, nor have we had our feminine contingent clad in ground-sweepers, but if you've been wondering about the altered appearance of this and all other editorial pages of this week's book, it's the result of a lot of new typesetting machines in our press division which have been equipped with a new face. It's called Ideal, and it is supposed to be more attractive and easier to read than the older face we've been using. Hope you like it! It's just part of the continuing job we try to do in order to make our efforts more attractive, and easier to read. The era when business papers looked like the Congressional Record, and incidentally read much like it, is gone. These days we've learned from thorough readership studies that appearance of an article does a lot to make reading it easier, and our art staff headed by Don Cadot has been doing a swell job of making things easy.

Shrdlu

(Editorial Index—Page 63)

STEEL

Vol. 121—No. 14 October 6, 1947

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Editorial Staff on Contents Page

SHARON STAINLESS GIVES PRODUCTS

Eye Appeal-Sales Appeal

TO THE CONSUMER eye appeal means *buy appeal.* The arresting appearance of Sharon Stainless Steel tips the sales in your favor. Quality-conscious consumers demand clean design . . . lasting beauty . . . permanent freedom from corrosion, stain and tarnish.

TO THE PRODUCT DESIGNER Sharon Stainless Steel means a superior product made under precise metallurgical control. It is ideal for deep drawing, spinning, roll forming, bending, welding, heat treating and machining.

TO THE FABRICATOR Sharon Stainless Steel means reduced fabricating and handling costs. Ease of fabrication of Sharon Stainless—furnished in coils up to 300 pounds per inch of width, or in cut lengths, if desired,—permits longer, smoother machine runs. Shipments are packaged on skids for quick, economical handling.

TO YOU we offer the services of qualified Sharon sales engineers to aid in selecting the proper steels to solve your specific fabrication problems. Call or write the nearest Sharon field office *today.*

SHARON STEEL CORPORATION

Sharon, Pennsylvania

SHARONSTEEL

PRODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO; DETROIT SEAMLESS STEEL TUBES COMPANY, DETROIT, MICHIGAN; BOPP STEEL CORPORATION, DETROIT, MICHIGAN; BRAINARD STEEL DIVISION, WARREN, OHIO. Hot and Cold Rolled Stainless Strip Steel — Alloy Strip Steel — High Carbon Strip Steel — Galvanite Special Coated Products — Cooperage Hoop — Detroit Seamless Steel Tubing — Seamless Steel Tubing in Alloy and Carbon Grades for Mechanical, Pressure and Aircraft Applications — Electrical Steel Sheets — Hot Rolled Annealed and Deoxidized Sheets — Galvanized Sheets — Enameling Grade Steel — Welded Tubing — Galvanized and Fabricated Strip Steel.

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FIRST IN DESIGN . . .

Kearney & Trecker announces new in accuracy . . First in rigidity . .

1 MILLING MACHINES AT THEIR BEST—
DESIGNED TO PUSH COST CURVES DOWN

Here it is — a new Kearney & Trecker — Milwaukee Series of Simplex Bed-Type Milling Machines

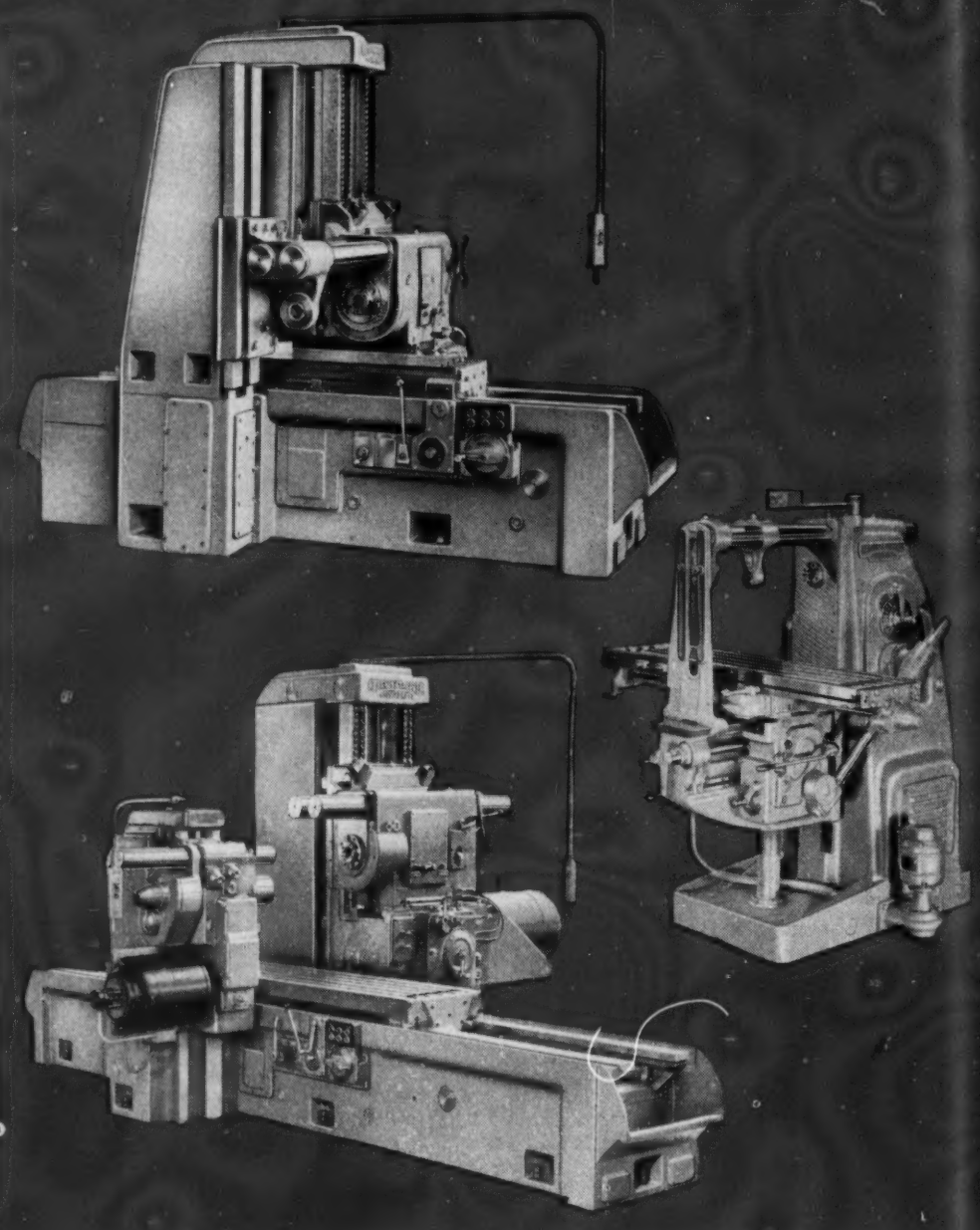
These machines bring you a completely new design with a combination of exceptionally wide working ranges and horsepower capacities for most effective use of modern cutting tools. For high production with fine precision—there's no better design on the market.

The new Kearney & Trecker — Milwaukee Model E simplified milling machine

"E" stands for Efficiency, Ease of operation and Economy. This machine incorporates every fundamental requirement for either foreign or domestic use. Its modern design plus economy of parts offers you the highest dollar for dollar value in efficiency obtainable anywhere.

Think of it! A series of Duplex Bed-Type Milling Machines offering 48 different working ranges and horsepower combinations!

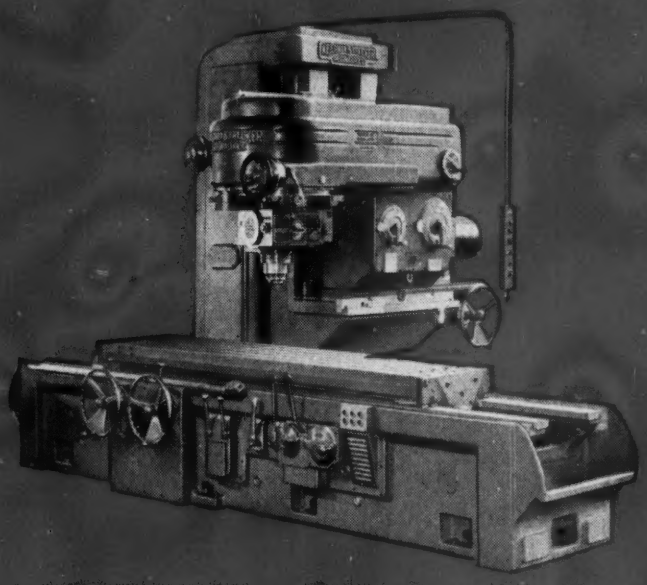
Machines that offer custom-built possibilities for your work at standard machine costs to you. Truly an entirely new concept in bed-type design — they use all modern cutting tools to maximum effectiveness. They give you high production, 1948 style.



KEARNEY &
CORPORATION

FIRST IN COST-CUTTING

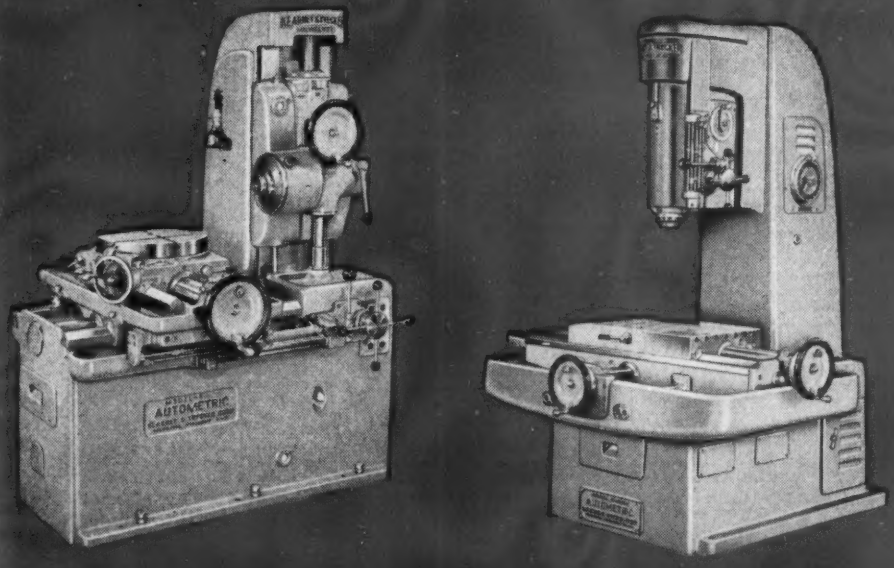
outstanding machine tools . . . First First in all-round performance!



World's most advanced milling machine

The new Model 5D combines bed-type machine working range with revolutionary Kearney & Trecker Rotary-Head Principle of Milling. Mills any geometric shape, in horizontal or vertical planes, directly from blue print, without models or templets. For versatility of application, it leaves nothing to be desired. If you make dies for drop forging, die castings, plastic parts or molds for permanent mold castings, you cannot afford *not* to investigate this machine.

2 BORING MACHINES AT THEIR BEST— DESIGNED TO PUSH PRECISION CURVES UP



America's finest precision boring machines

The Model B Autometric (left) for horizontal work and the Model C Autometric (right) for vertical work. Each machine is the direct result of nearly a half-century of experience and several years of intensive research in design and manufacture of precision machine tools. Every refinement, of a practical nature, that can be used in performing highly accurate work has been incorporated in these machines. You will be amazed at the three-dimensional accuracy in the performance of these precision tools.

TRECKER

MILWAUKEE 14, WISCONSIN

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

A-481

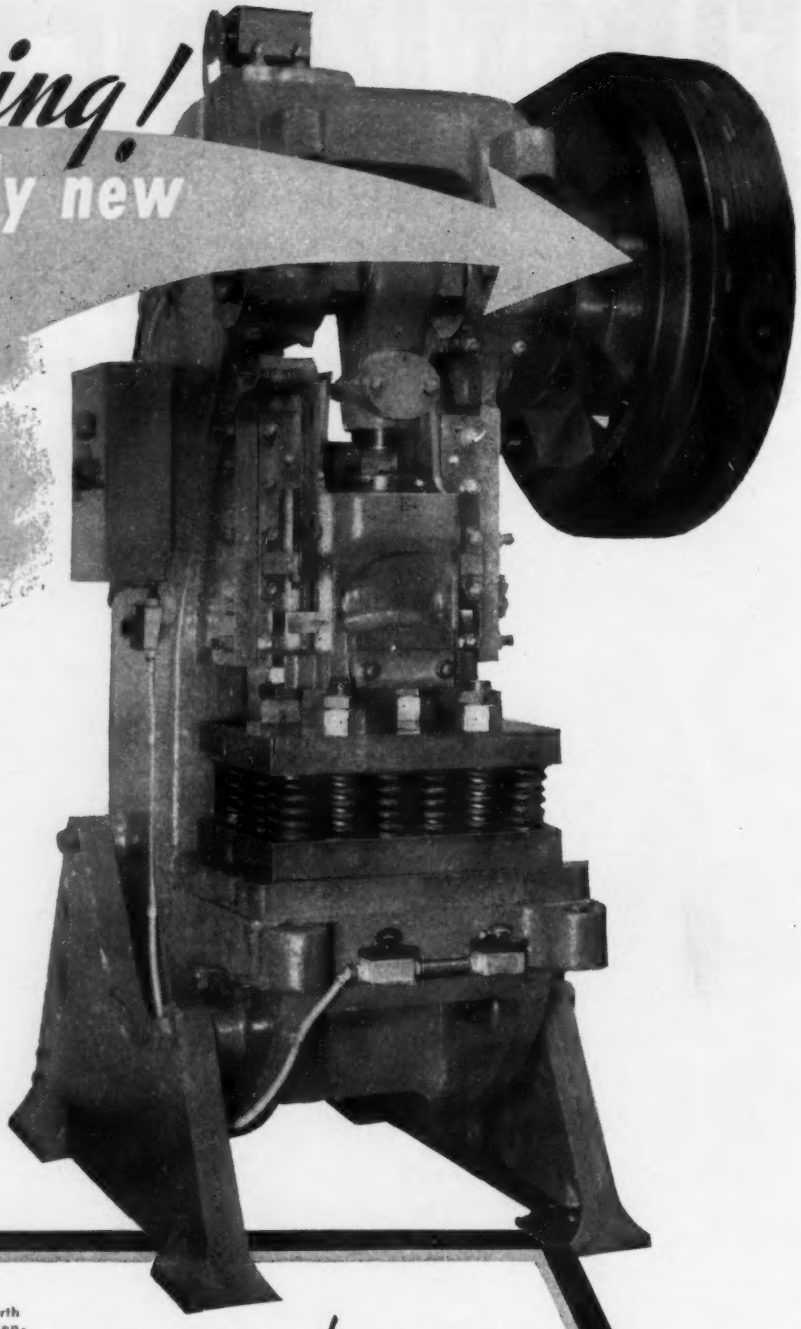
Announcing!

an entirely new

DRUM TYPE

(pat's. pend.)

AIR FRICTION CLUTCH



This new Cleveland Drum Type Air Friction Clutch and Brake (Pat's. Pend.) is not merely a conventional disc type Clutch incorporating a few minor changes or improvements, but a radically new design which incorporates the Clutch and Brake into a combined unit of one-piece construction, with 14 features for efficiency and economy of operation.

Furthermore, this Drum Type Clutch has approximately half the number of parts and is about one-fourth the weight of a disc clutch and, due to the lightness in weight, quicker starting and stopping is assured and there is also a considerable saving in the horsepower required to operate the Clutch.

Designed by Cleveland Engineers to meet the demand of Power Press users for an exceptionally dependable Clutch, this Drum Type Clutch, which has been subjected to every conceivable test, and the critical inspection of many leading Pressed Metal manufacturers, will soon be available in a complete range of sizes for either flywheel or back geared machines.

✓ CHECK THESE 14 IMPORTANT FEATURES OF THIS SENSATIONALLY NEW DRUM TYPE *(Pat's. Pend.)* AIR FRICTION CLUTCH.

- ✓ Approximately one-fourth the weight of a conventional disc friction Clutch of equal capacity.
- ✓ Approximately half the number of parts of a conventional disc friction Clutch
- ✓ Light weight assures considerable saving in horsepower required to operate the Clutch.
- ✓ The design and lightness of parts contribute to quicker starting and stopping.
- ✓ Complete disengagement of all idle friction surfaces eliminates drag, unnecessary wear and heat, and assures longer friction "life"
- ✓ Clutch is self-adjusting which results in easy maintenance and low upkeep.
- ✓ Can be serviced readily without removal from the Press.
- ✓ Air cylinders provide maximum performance with minimum amount of air.
- ✓ Positive brake brings machine to immediate stop in the event of failure of electric current or air supply.
- ✓ Clutch can be set to slip under overload.
- ✓ Clutch temperature remains slightly above room temperature — no excessive heating.
- ✓ Can be applied to any size new or old Press, flywheel or geared.
- ✓ Is mounted directly on the driveshaft.
- ✓ Combined unit of one-piece construction — Clutch and Brake cannot become separated or engaged simultaneously.

THE PRESS ILLUSTRATED IS A CLEVELAND No. 9-1 INCLINABLE FLYWHEEL TYPE WHICH HAS A CAPACITY OF 75 TONS

THE CLEVELAND PUNCH & SHEAR WORKS CO.

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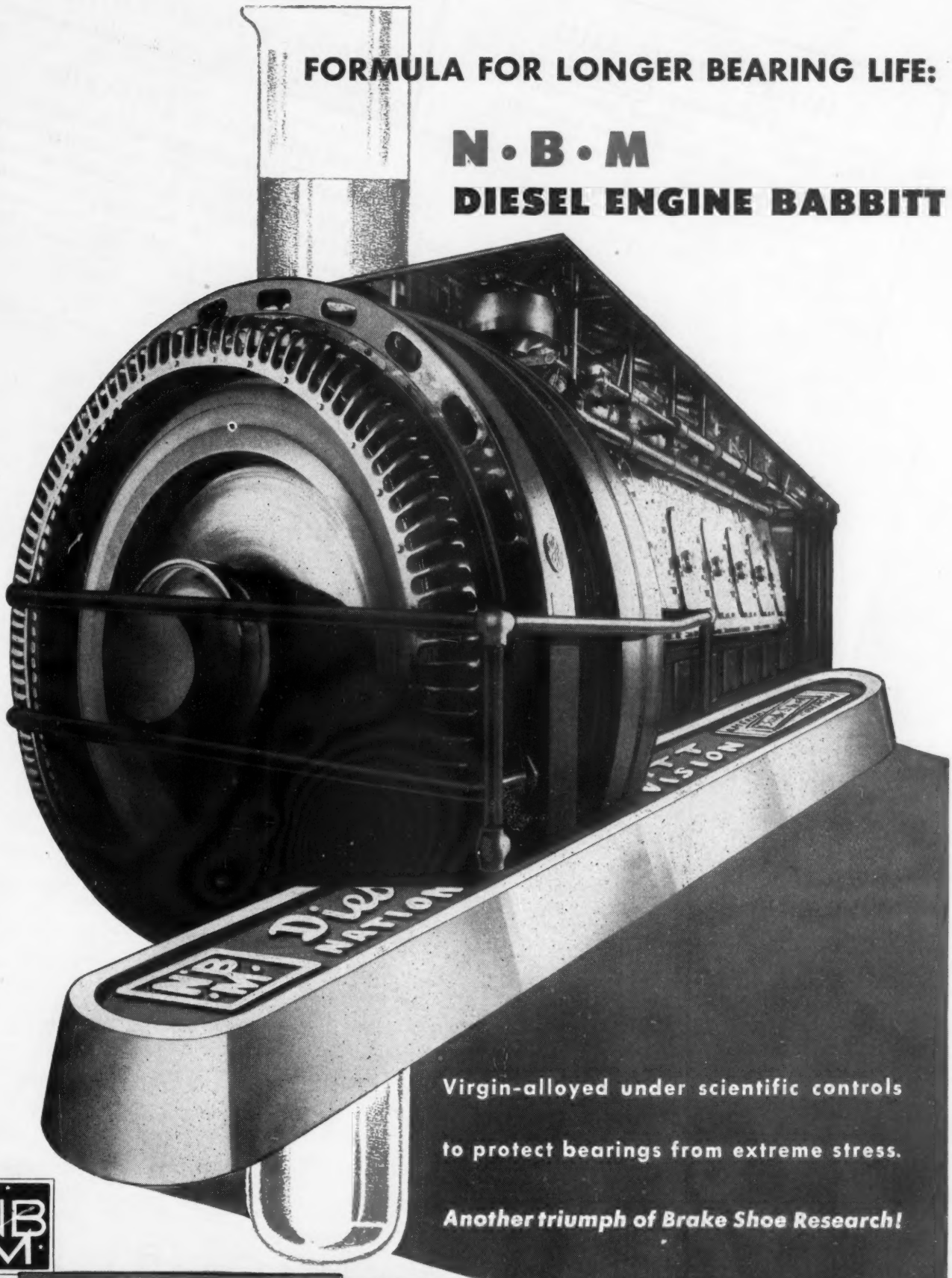
FORMULA FOR LONGER BEARING LIFE:

N • B • M
DIESEL ENGINE BABBITT



Virgin-alloyed under scientific controls

to protect bearings from extreme stress.

Another triumph of Brake Shoe Research!

NBM

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION
ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

SELF-RECTIFYING SALTS

For neutral hardening—Liquid Heat 1145. No decarb; stays neutral automatically for long periods. Work comes out bright. Pots last longer.

For high speed steel—Liquid Heat 1550. Rectified by immersed carbon rod. Low drag-out . . . prolonged electrode life.

INTERRUPTED QUENCHING

Houghton's MAR-TEMP Salt for martempering, austempering . . . providing rapid quenching speed through the critical zone; stable, non-sludging, non-scaling, fluid. Assures freedom from distortion or quench cracks. For hot oil quench—MAR-TEMP Oil, usable up to 450° F.

LIQUID CARBURIZING

PERLITON Liquid Carburizer provides a uniform, true carbon case with rapid rate of penetration, up to 0.160" deep. Excess carbon blankets the bath, insulates it against oxidation. A new Perliton now available, soluble in water, to permit easy, speedy cleaning.

The HOUGH

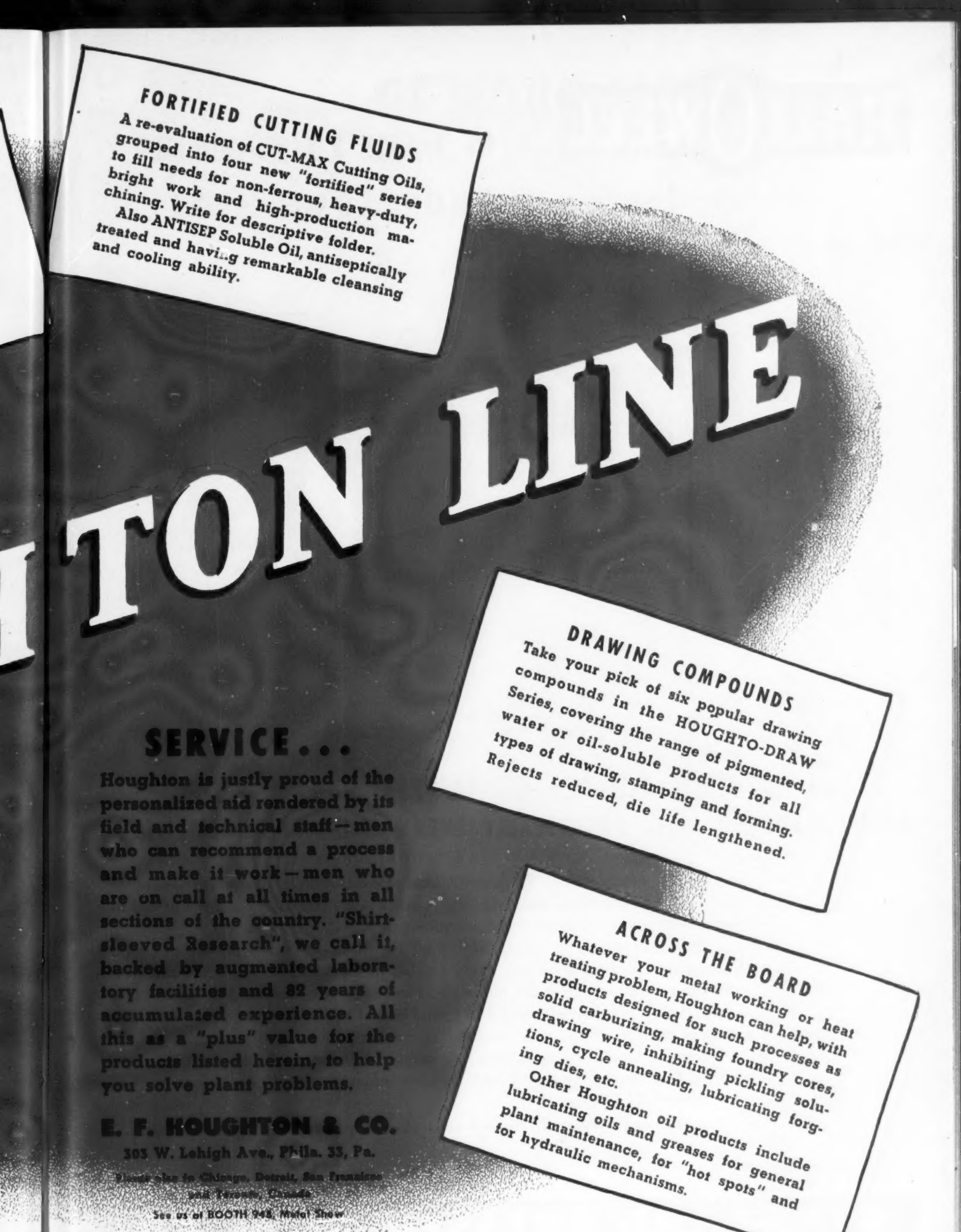
Metal Working and Heat Treating Materials that help metal men meet today's demand for greater productivity.

METAL CLEANERS

The HOUGHTO-CLEAN "200" Series includes alkaline, solvent and emulsion-type cleaners for ferrous and non-ferrous metals. Their speed and effectiveness is proved by fluorescent test under ultra-violet light. Based on new developments in detergents, alkalies and emulsifiers.

RUST PREVENTIVES

Supporting the war-proven line of COSMOLINES is a new cold-stripping compound—HOUGHTO-KOTE COLD STRIP—demonstrated for the first time at the Chicago Metal Show. Houghton provides all types of inhibited preventives: drying, non-drying, waxy, grease-type, thin-film-polar-type, and hot-dip strip coatings.


FORTIFIED CUTTING FLUIDS
A re-evaluation of CUT-MAX Cutting Oils, grouped into four new "fortified" series to fill needs for non-ferrous, heavy-duty, bright work and high-production machining. Write for descriptive folder. Also ANTISEP Soluble Oil, antiseptically treated and having remarkable cleansing and cooling ability.
TON LINE
DRAWING COMPOUNDS
Take your pick of six popular drawing compounds in the HOUGHTO-DRAW Series, covering the range of pigmented, water or oil-soluble products for all types of drawing, stamping and forming. Rejects reduced, die life lengthened.
ACROSS THE BOARD
Whatever your metal working or heat treating problem, Houghton can help, with products designed for such processes as solid carburizing, making foundry cores, drawing wire, inhibiting pickling solutions, cycle annealing, lubricating forging dies, etc.
Other Houghton oil products include lubricating oils and greases for general plant maintenance, for "hot spots" and for hydraulic mechanisms.
SERVICE . . .
Houghton is justly proud of the personalized aid rendered by its field and technical staff—men who can recommend a process and make it work—men who are on call at all times in all sections of the country. "Shirt-sleeved Research", we call it, backed by augmented laboratory facilities and 82 years of accumulated experience. All this as a "plus" value for the products listed herein, to help you solve plant problems.
E. F. HOUGHTON & CO.
303 W. Lehigh Ave., Phila. 33, Pa.
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and Toronto, Canada
See us at BOOTH 948, Metal Show

HALLOWELL

THE NAME TO REMEMBER for your SHOP EQUIPMENT

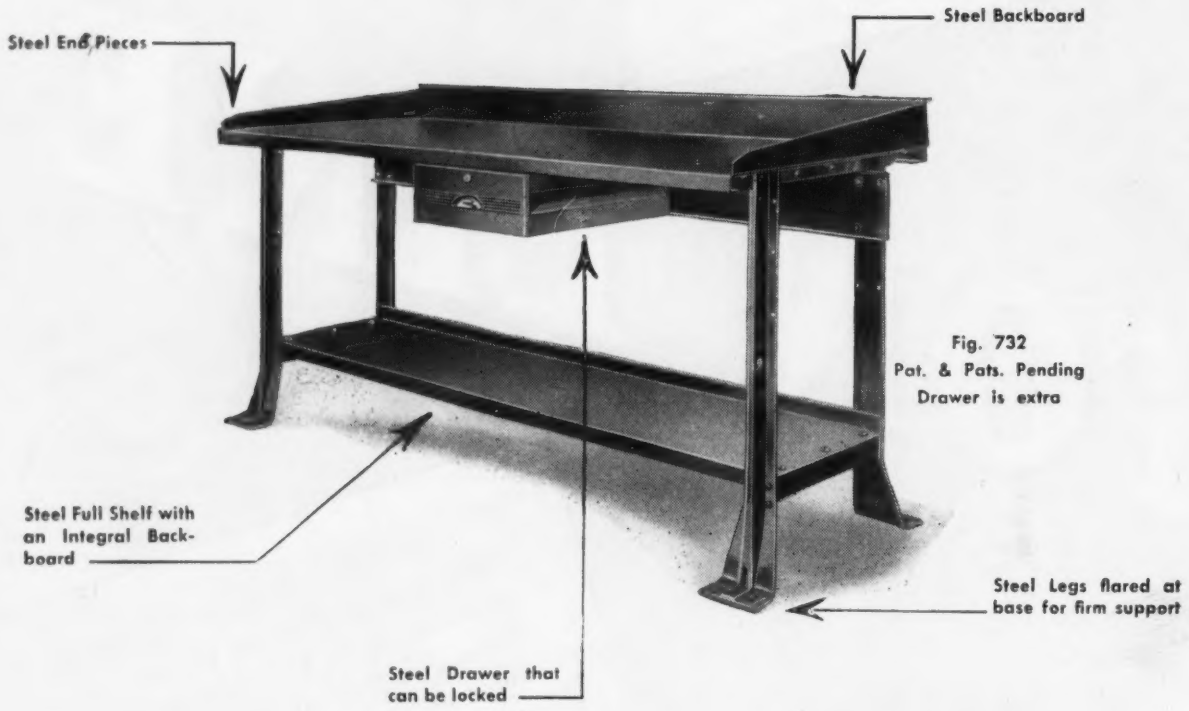

Steel End Pieces
Steel Backboard
Steel Full Shelf with an Integral Back-board
Steel Drawer that can be locked
Steel Legs flared at base for firm support

Fig. 732
Pat. & Pats. Pending
Drawer is extra

STEEL WORK-BENCHES WITH *STEEL* TOPS

READY-MADE TO MEET PRACTICALLY EVERY SHOP REQUIREMENT

The famous ready-made "Hallowell" Line signifies quality Shop Equipment of sturdy, steel construction, good design, years of wear and utility and the ability to meet practically every plant or shop requirement.

These exceptionally strong "Hallowell" Work Benches of Steel are designed to stand firm and rigid without costly bolting to the floor; and to withstand constant use and abuse. They are made in a number of standard heights, widths and lengths, which are easily moved and joined end to end to form a continuous work-bench of any length.

Several hundred interchangeable combinations make it almost certain that you will find exactly the right bench for your requirements. Write for your copy of the "Hallowell" Catalog.

"Unbrako" and "Hallowell" Products are sold entirely through Industrial Distributors.

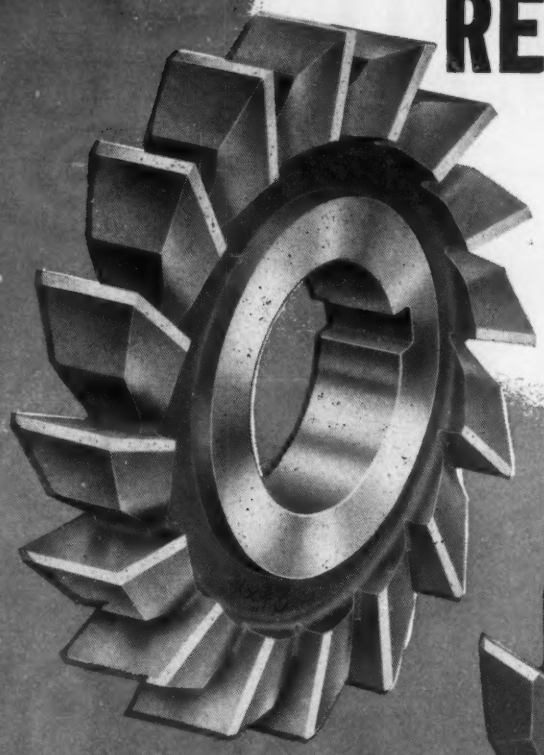
OVER 44 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA., BOX 579 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

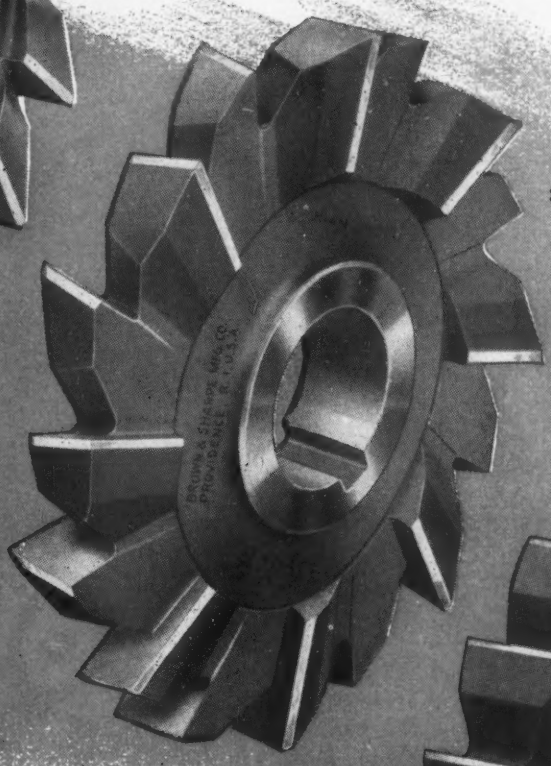
REMOVE METAL *Fast*

with these Brown & Sharpe Side Mills



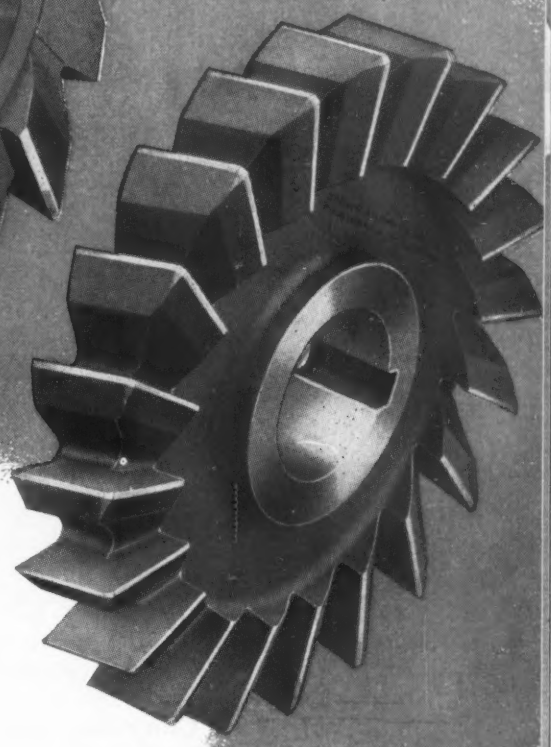
SIDE MILLING CUTTERS

Frequently used in pairs for sizing nuts, bolt heads and similar work. Have cutting edges on both sides of teeth as well as periphery.



STAGGERED TOOTH SIDE MILLING CUTTERS

Alternate right- and left-hand spiral angles with considerable angle of undercut permit these cutters to remove large amounts of metal without destructive vibration and chatter. Used in pairs as interlocking cutters.



HALF SIDE MILLING CUTTERS

Used for side cuts, as in straddle milling or in cutting slots, where complete bottom finish isn't required. Spiral on top and undercut on side give teeth improved cutting action.

PUT any one of these Brown & Sharpe Side Milling Cutters to work on a piece of metal and that metal will take shape quickly and accurately. In actual operation, you'll benefit by the inherent qualities of Brown & Sharpe design and craftsmanship that set the pace for all types of cutters.

These side mills have clean-cutting qualities . . . ample chip space, carefully calculated rake angle, selected steels, scientific heat treatment individualized for each type of cutter, and expert sharpening. These are qualities that users have learned to expect in Brown & Sharpe Cutters. They're money-savers and production boosters because they combine to give unexcelled performance in speed, accuracy and more pieces per sharpening. Specify Brown & Sharpe when ordering cutters. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

We urge buying through the Distributor

BROWN & SHARPE CUTTERS B·S

EVERYONE'S HEADING FOR THE METAL SHOW

CHICAGO — OCTOBER 18th thru 24th

INTERNATIONAL AMPHITHEATRE

There's no substitute for the National Metal Congress & Exposition (Metal Show, to you). No where else does the metal industry see all the new developments in the thousand-and-one products it uses and needs. Nowhere else are new metals and metal forms, new welding machines, furnaces, cutting tools, lubricants — nowhere are *all* these demonstrated and discussed by technical leaders in the industry. That's a glimpse of the National Metal Exposition.

Then take the Metal Congress. Four big national societies plan a whole series of technical lectures on the important progress in the industry. Almost a hundred research leaders present and discuss more than 75 papers.

There's something doing all the time. Something that increases production-line efficiency in the metal industry. So plan to be there, in Chicago. The Exposition opens Saturday, Oct. 18, in the International Amphitheatre and runs every day thru Friday, Oct. 24. Technical sessions of the Metal Congress start Monday morning, Oct. 20.

Sponsored by the American Society for Metals, in cooperation with the American Welding Society, the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers, and the American Industrial Radium and X-Ray Society.

SEE YOU AT THE METAL SHOW CHICAGO!

P.S.

Make your hotel reservations now by letter or wire to the Housing Bureau, National Metal Exposition, c/o Chicago Convention Bureau, 33 N. LaSalle Street, Chicago.

For Precision Threading at High Production

LANDMACO THREADING MACHINE

The LANDMACO Threading Machine equipped with the LANCO Head will give you quality threads at low operating cost.

It can readily be set up to handle all types of threads and it assures smooth-finished well-formed threads of class 3 fit on the toughest alloy steel.

Write for Bulletin H-75

LANDIS MACHINE CO.
WAYNESBORO · PA. · U. S. A.

New MICROMATIC QUILL-TYPE HIGH PRODUCTION HYDROHONERS

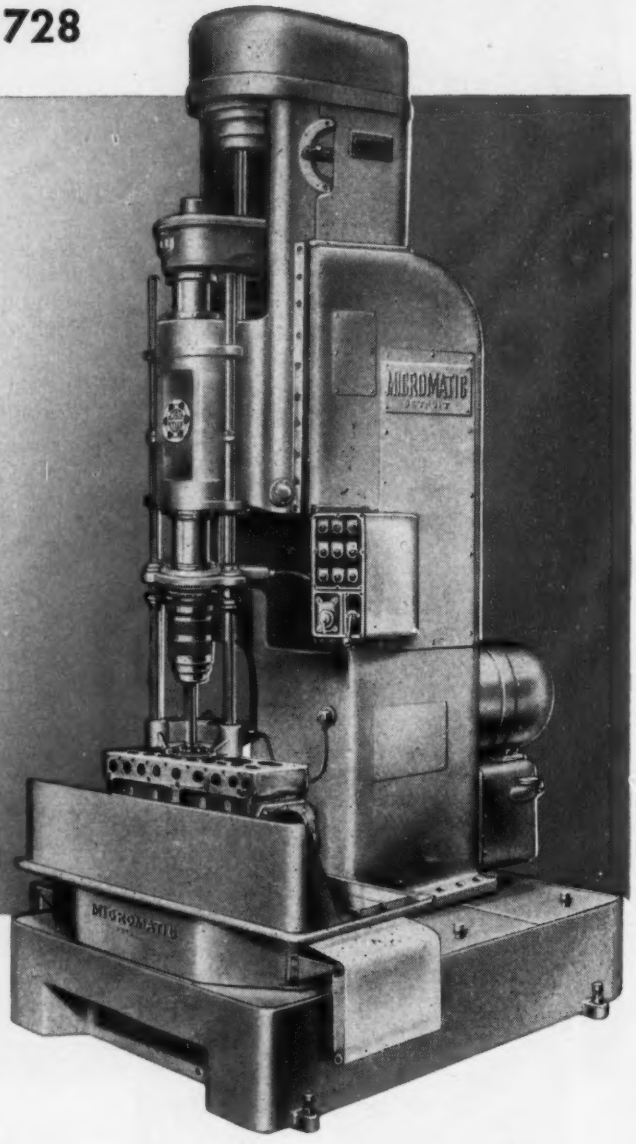
MODELS 723, 724 and 728

THESE new spindle-in-quill, unit constructed, hydraulically actuated, heavy duty Hydrohoner machines are designed for Microhoning bores from ¼ in. to 4 in. in diameter, in lengths from ⅛ in. to 9 in. in high production. When equipped with the latest electronic MICROSIZE control, uniform size is automatically and dependably generated within 0.0001 in. to 0.0003 in.

Important advantages are gained by the spindle being in the quill: torque and thrust are taken about the centerline of the spindle—guide bars are unnecessary—alignment is assured—the weight of machine parts reciprocated in stroking is substantially reduced—reciprocating speeds may be increased without added power input.

By combining spindle rotation speed control, stroke control, hydraulic control panel, and MICRODIAL mechanisms in the head unit, all mechanical linkages, hydraulic pipe and fittings, usually required are eliminated.

All electrical equipment is located for most convenient service and maintenance.



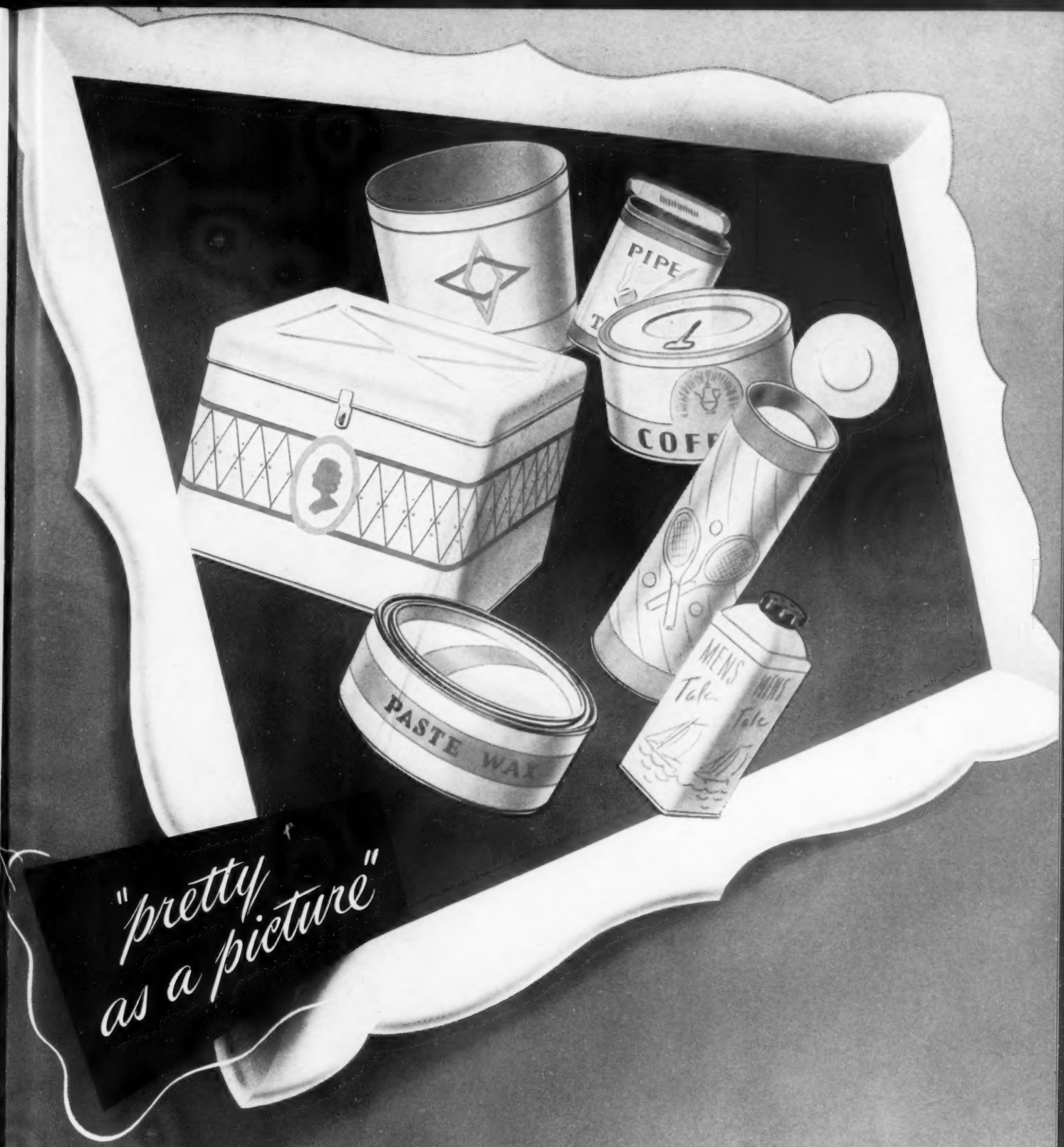
Specifications

Model	723	724	728
Work capacity, dia.	¼—1"	¾—2"	1½—4"
length	¼—6"	¼—8"	¼—9"
Overall height x width x length	110x44½x60½"	127x44½x60½"	127x44½x60½"
Base at floor, width x length	44½x60½"	44½x60½"	44½x60½"
Spindle reciprocation stroke	0—7⅛"	0—7⅛"	
Quill stroke	10	12	12
Clearance—spindle to column	10	10	10
Spindle nose to pads, max.	46	48	48
Hydraulic oil capacity	25	25	25
Coolant tank capacity	60	60	60

MICRO MATIC TRADE MARK REGISTERED

MICROMATIC HONE CORPORATION • DETROIT 4, MICHIGAN

DISTRICT FIELD OFFICES: 1323 S. Santa Fe, Los Angeles 21, Cal. • 194 Dalhousie St., Brantford, Ont., Can. • 616 Empire Bldg., 206 S. Main St., Rockford, Ill. 927 A—M & M Bldg., P. O. Box 981, Houston 2, Texas • Post Road, Guilford, Conn.



"pretty as a picture"

the way you can lithograph, enamel and lacquer

Products made from Weirite Electrolytic Tin Plate have plenty of eye-appeal on the nation's counters. Its uniform, fine-texture surface is well suited to all kinds of colorful merchandising dress.

Recommended for dry-packed containers—for cannisters, closures and light toys . . . Weirite Electrolytic Tin Plate is the most economical form of rustproof metal you can use.

Other Weirton tin mill products are Weirite Hot-Dip Tin Plate for liquids and foodstuffs requiring high corrosion-resistance, and Weirite Tin Mill Black Plate.

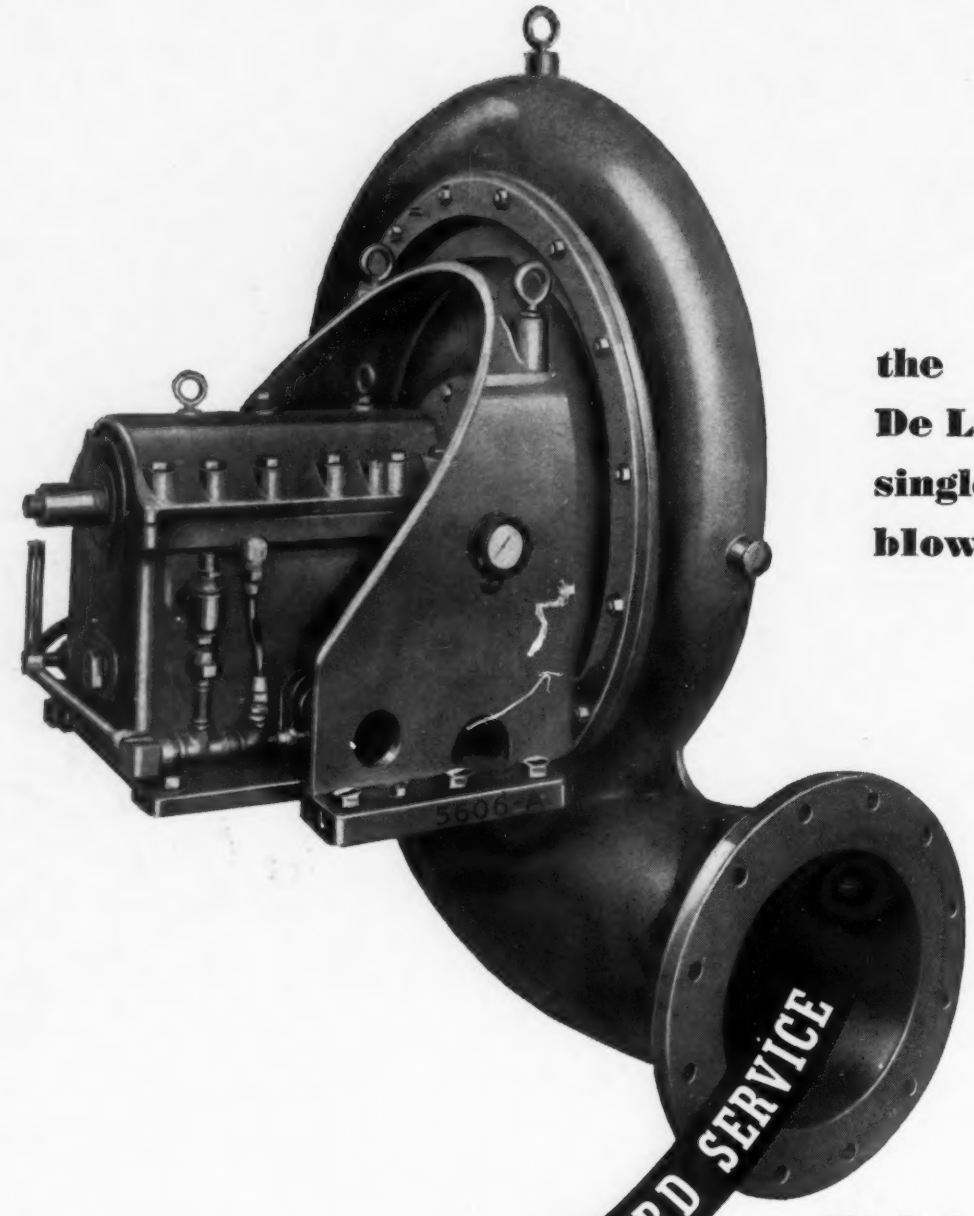
WEIRITE

Electrolytic Tin Plate

WEIRTON STEEL COMPANY

WEIRTON, W. VA. *Sales Offices in Principal Cities. Division of* NATIONAL STEEL CORPORATION *Executive Offices, Pittsburgh, Pa.*

WEIRTON STEEL COMPANY



the De Laval single inlet blower

A RUGGED BLOWER FOR HARD SERVICE

This De Laval blower has been designed and constructed to meet the most exacting service with the utmost reliability and efficiency. The heavy, cast casing is smoothly finished and scientifically contoured. The vanes of the built-up forged steel impeller are curved to assure stable flow characteristics. A Kingsbury type thrust bearing is employed in place of ball or collar type thrust bearings. The sleeve type bearings in the pedestal are pressure lubricated. The case rings are replaceable. The discharge opening may be positioned at any angle in 15° increments for either direction of rotation.

C-5

DE LAVAL

STEAM TURBINE CO.

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for Surface Grinding

There is no surer way of selecting the correct hardness for your segmental wheels than through BAY STATE Fractional Grades. This important manufacturing refinement enables you to choose the exact degree of hardness desired by splitting every normal grade into *three* degrees of hardness, where a whole grade change would be too great.

Whether it's straight, cup, cylinder, or segmental wheels that BAY STATE supplies for surfacing equipment, maximum grinding efficiency is assured. Write us for specific recommendations.

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CUT PRESSURE DROP 50%!

Operating tests prove you can reduce pressure drop in your hydraulic or fluid transmission systems by installing PARKER Globe Valves.

The secret is free flow. The offset body design eliminates pockets and intricate chambers that trap liquids and gases. The result is smoother flow—less turbulence—and less pressure drop—by as much as 50%.

PARKER Needle Valves also keep pressure drop low. You can install these Globe and Needle valves directly into the circuit. Models are available in various combinations of tube ends and pipe threads, thus eliminating awkward adapters that block flow—add weight—and take up valuable space.

If you're interested in pressure-tight systems for moving liquids and gases, you'll want more information about these *precision*-made PARKER Valves. Write for Bulletin A52.

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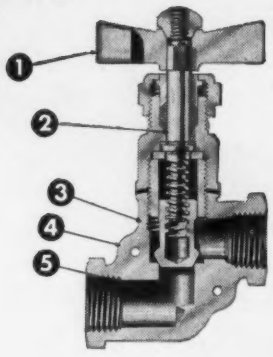
Parker
TUBE FITTINGS • VALVES



WHY PARKER GLOBE VALVES GIVE TROUBLE-FREE SERVICE

1—Prong handle provides easy grip.

2—Stem is non-rising type—permits easy installation where space is limited.

3—Forged brass body is small, flat, thin, strong.

4—Mounting lugs are forged into the body.

5—Offset design provides smooth, free flow.

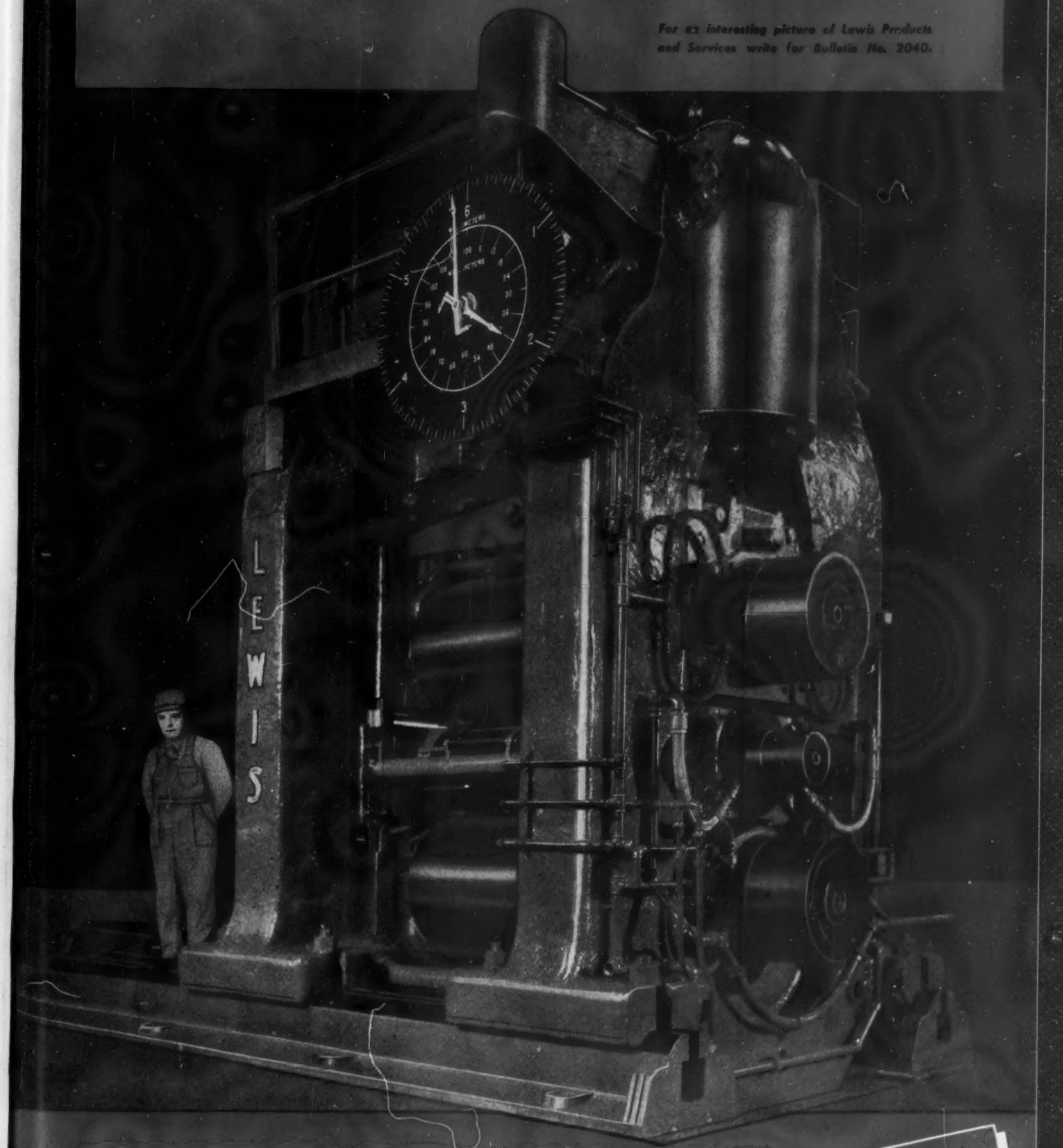
★

PARKER offers manufacturers a complete line of precision-made industrial valves for small diameter tubing systems.

ENGINEERED SIMPLICITY

This 60-inch, Three-High Mill is typical of all Lewis equipment... extremely simple in design, extra sturdy in construction. Result — ease of operation, economy of maintenance, greater profits for the owners.

For an interesting picture of Lewis Products and Services write for Bulletin No. 2040.



LEWIS ROLLING MILL EQUIPMENT

Also Manufacturers of ROLLS AND ROLLING MILL MACHINERY FOR THE IRON, STEEL AND NON-FERROUS INDUSTRIES

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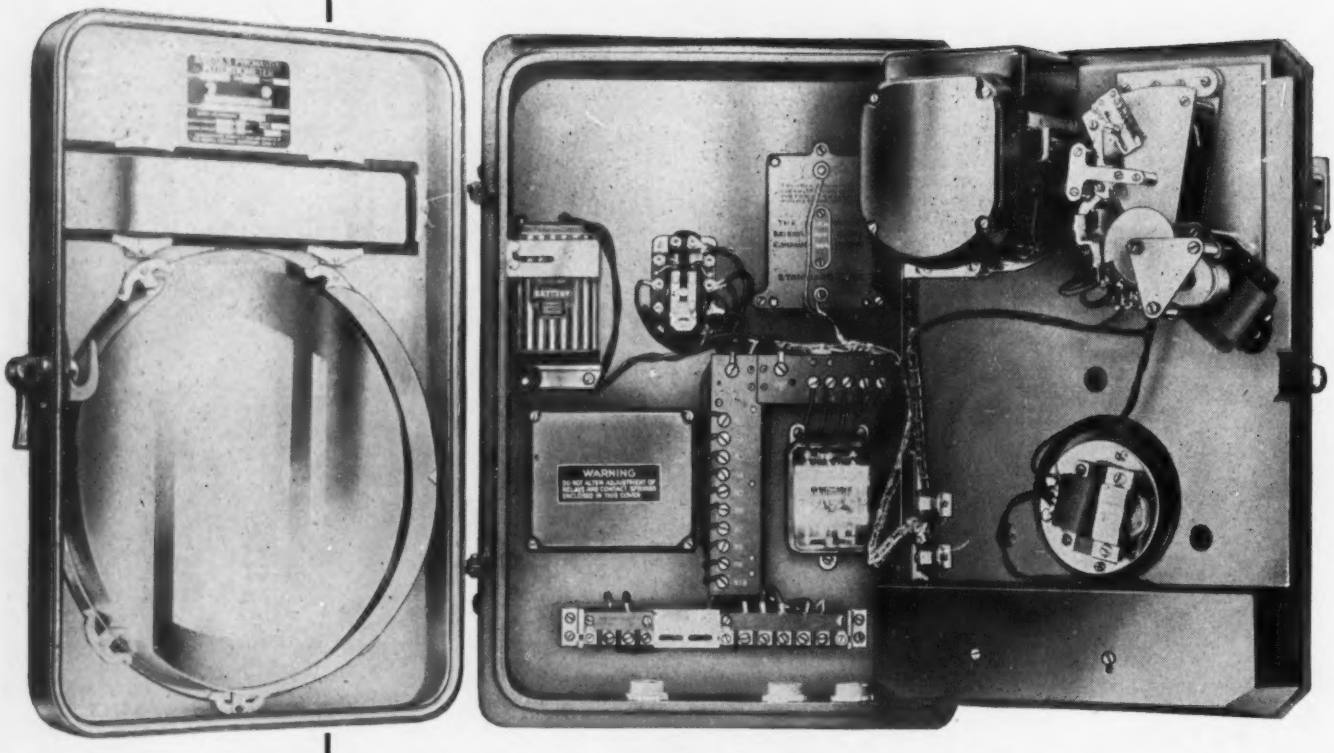
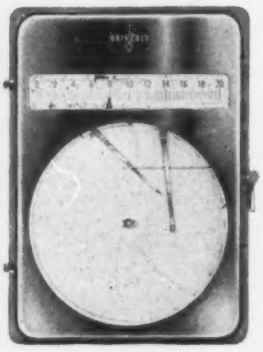
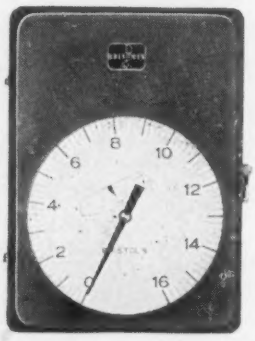
Improved



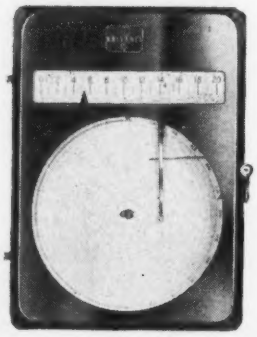
PYROMASTER ELECTRIC CONTROL





Electric Type Recorder Controller and Dial-Indicating Controller. Offered in a variety of on-and-off, proportioning, and proportional current-input models.

RECORDER



Indicating-Recording Pyromaster. Built in single- and two-pen models.

Four ways

for trouble-free high temperature automatic control

Latest models of Bristol's PYROMASTER Pyrometer . . . a self-balancing potentiometer for indicating, recording and controlling furnaces and ovens . . . respond rapidly, have greater accuracy and stand the gaff.

Here are *four* of the improvements that account for the PYROMASTER'S greater convenience in use and maintenance:

- *totally enclosed, gasketed galvanometer and relays for better protection and easy servicing.*
- *standard cell for accuracy.*
- *high torque motor for ruggedness and positive action.*
- *a hinged panel for better accessibility.*

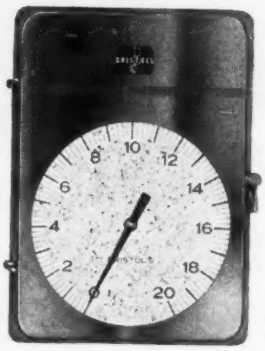
Available in several models for a variety of metallurgical applications . . . temperatures up to 3600°F. Bulletin P1200 gives the complete story on the PYROMASTER. Write today—THE BRISTOL COMPANY, 105 Bristol Road, Waterbury 91, Conn.

BRISTOL

Gives YOU the Most from Heat

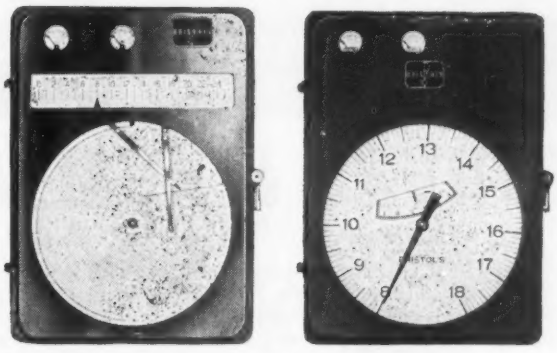
AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

INDICATOR



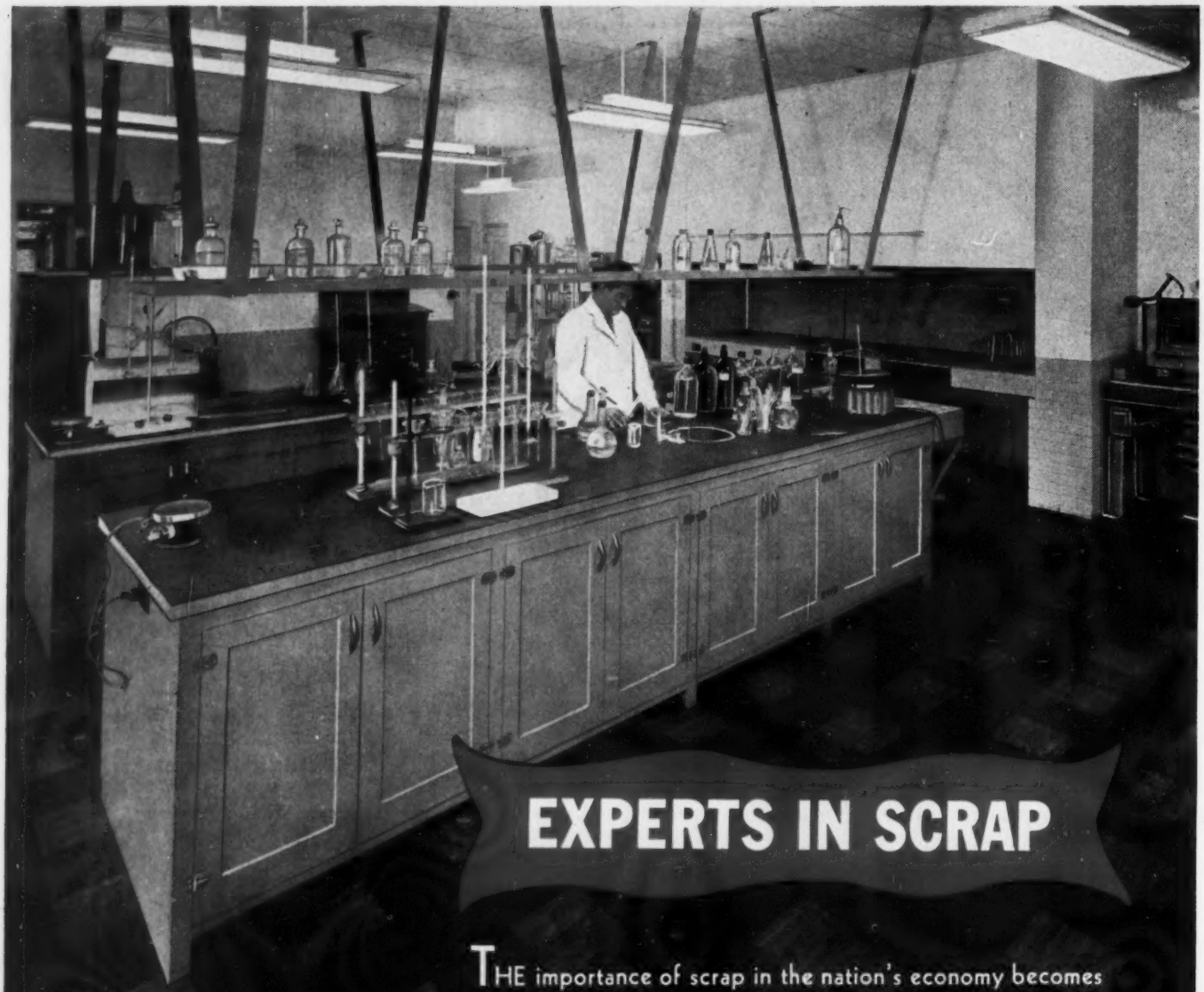
Dial-Indicating Pyromaster. The indicating scale is 28 inches long.

PYROMASTER AIR CONTROL



Air-Operated Recorder Controller and Dial-Indicating Controller. Instruments furnished for four types of control, including proportioning and proportioning with reset.

Many models in stock for immediate delivery



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To keep us abreast of the newest technical developments in the iron and steel scrap field, we have recently opened a laboratory in Reading, Pennsylvania.

This new laboratory is evidence of our claim to leadership in the scrap field since 1889.

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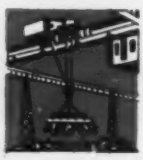

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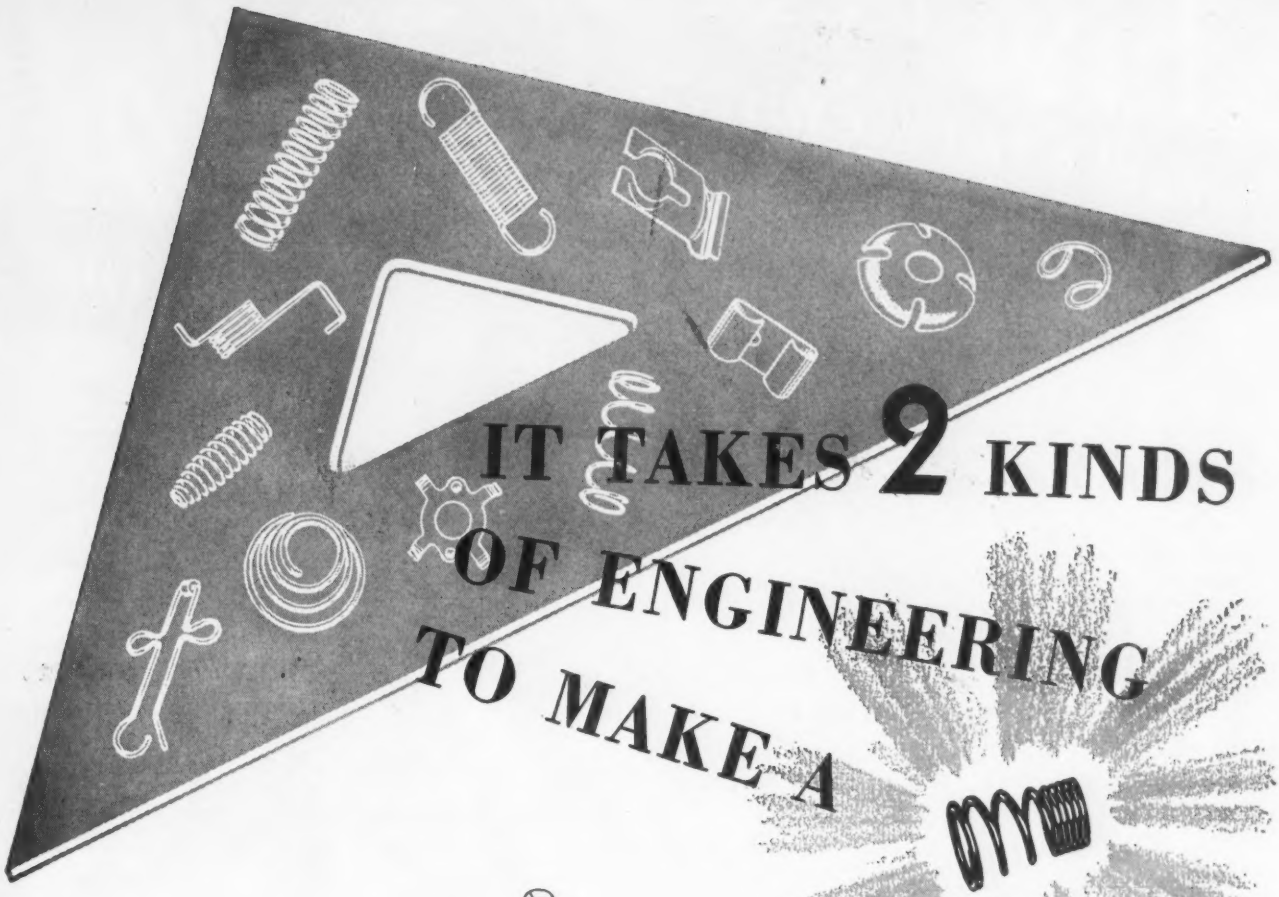
LEADERS IN IRON AND STEEL SCRAP SINCE 1889



IT TAKES 2 KINDS OF ENGINEERING TO MAKE A

Yours

Ours

When your spring specifications call for extra close limits, accuracy at different load tests, tricky bends or end treatment—it's no simple matter to meet them—without costly second operations—*unless* . . . . .

. . . . *someone gives those specifications a good going over for production problems.* Here at Wallace Barnes are men who know how to utilize machinery, materials and methods to get the results you want, in the fewest operations. This knowledge, applied *in the early stages of your design*, may also simplify your problems—or help to avoid costly and unnecessary motions. It's worth a try; next time you plan a spring, let us help, too!

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SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

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DIVISION OF THE ASSOCIATED SPRING CORP.

AND IN CANADA, THE WALLACE BARNES CO., LTD., HAMILTON, ONTARIO

Need a Part like this....

With an Inside like this?

It's an ALCOA ALUMINUM IMPACT EXTRUSION

for Electrol, Inc., Kingston, N. Y.

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Almost any shape that is generally symmetrical can be made as an Alcoa Aluminum Impact Extrusion. Bosses, lugs, wall fins, and other special features are formed integrally at the instant of impacting, with minimum tooling. That's why over-all costs are lower, finish-machining time is less, and design possibilities are almost unlimited.

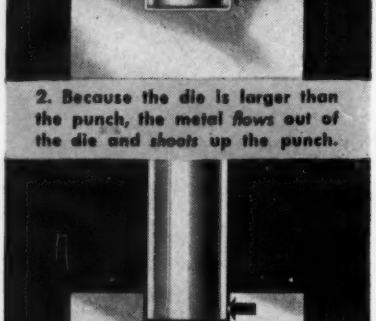
What's more . . . you get the light weight of Alcoa Aluminum, only ⅓ that of steel and brass. You get a good surface that will take any finish that other metals will take, plus the patented Alumilite finish that's exclusive with aluminum.

Our salesmen can advise you where and how to use these amazing impact extrusions to save money, machine time, and assembly costs. ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pa. Sales offices in leading cities.

HOW THEY'RE MADE...

1. A slug of aluminum is struck one sharp blow in a die by a punch.

2. Because the die is larger than the punch, the metal *flows* out of the die and *shoots* up the punch.



3. The space between the die and punch determines wall thickness. The external design features are incorporated in the die, the internal in the punch.

MORE PEOPLE WANT **MORE** ALUMINUM FOR **MORE** USES THAN EVER

ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

Just Released!

The Newest SUNDSTRAND Guide to Profitable Production Milling!

Here's another new helpful milling production data book. You'll find the same kind of helpful ideas in this book that you found in our book entitled "Practical Milling Methods." In fact, this is really book number 2 of "Practical Milling Methods." For instance, it contains:

40 Pages of Helpful Prodution Milling Information

This 40 page booklet reveals how most production milling problems can be solved most economically by one or a combination of only three different methods. It offers a new, direct and simple approach to solving production milling problems *profitably* . . . includes applications of milling in all types of metal working plants, all metals. You'll get some fresh ideas from this book . . . ideas you can use now or later. It contains:

Over 35 Actual Problem Solutions and Tooling Diagrams

Not theory, but actual, practical milling production methods are analyzed in this new book. Included are over 35 specific applications of standard, modified standard and entirely special machines with the actual milling production methods revealed in tooling diagrams. Each example illustrates the most practical solution to one specific problem.

Each is the result of a Sundstrand "Engineered Production" study—a procedure which determines the most practical milling method first, then the most practical machine design to suit this method.

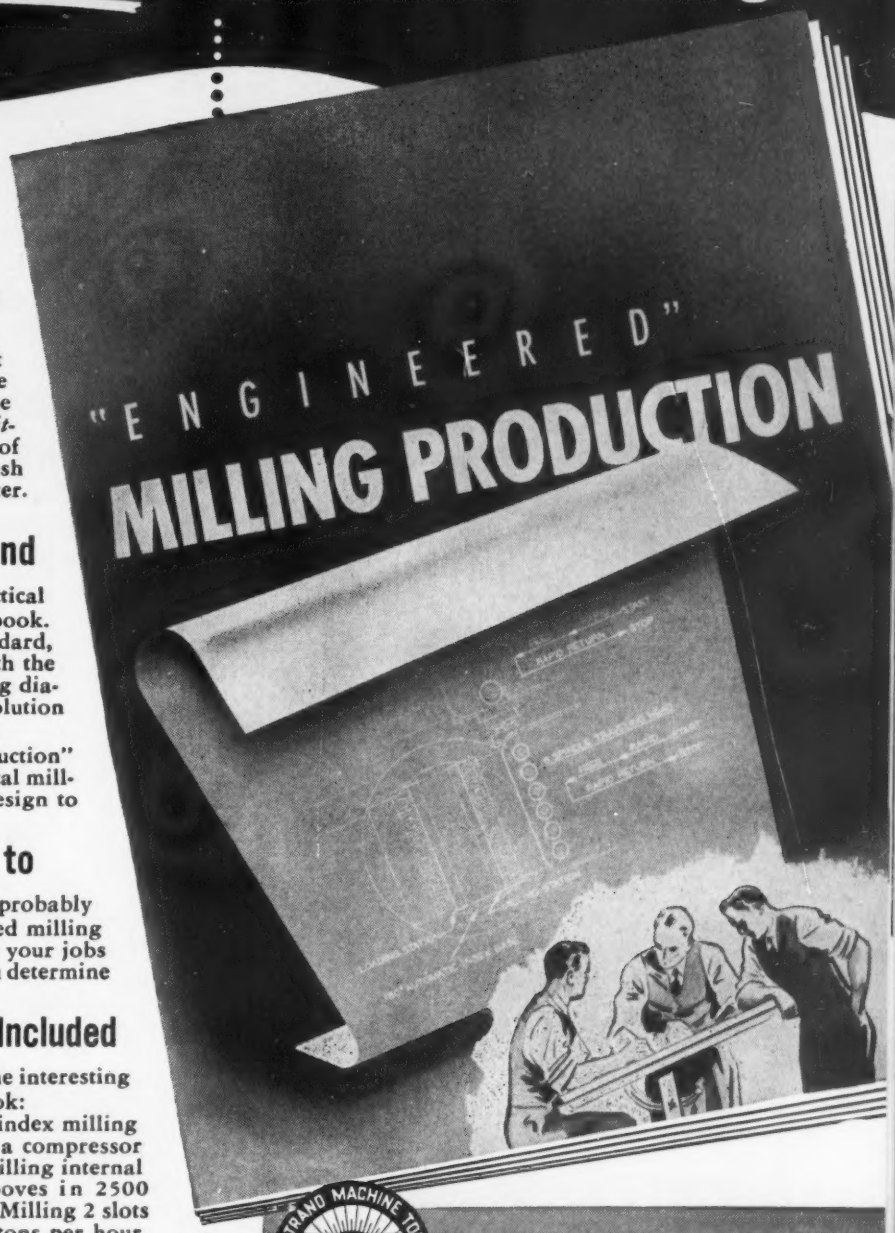
How to Use this Factual Information to Simplify Your Milling Production

You'll probably find jobs similar to yours among the many diversified milling problem solutions illustrated in this book. Checking your jobs with the simple, effective methods offered will help you determine the most profitable solution to the job at hand.

Here Are a Few of the Milling Jobs Included in this Helpful Book

These are but a few of the interesting milling jobs illustrated and described in this new book:

• Straddle milling lugs on clutch plates • Automatic index milling of 6 blind end grooves • Duplex milling 4 sides of a compressor block • Milling 11 surfaces on exhaust manifold • Milling internal slot in an outboard motor part • Milling 6 oil grooves in 2500 piston rings per hour • Milling 2 slots and radius in 1200 pistons per hour.



WRITE TODAY FOR

Free

40-PAGE MILLING BOOK!

• •

Check your jobs with the simple milling production methods described in this new outstanding book. It's free, write on your company letterhead, ask for book No. 764.

SUNDSTRAND MACHINE TOOL COMPANY

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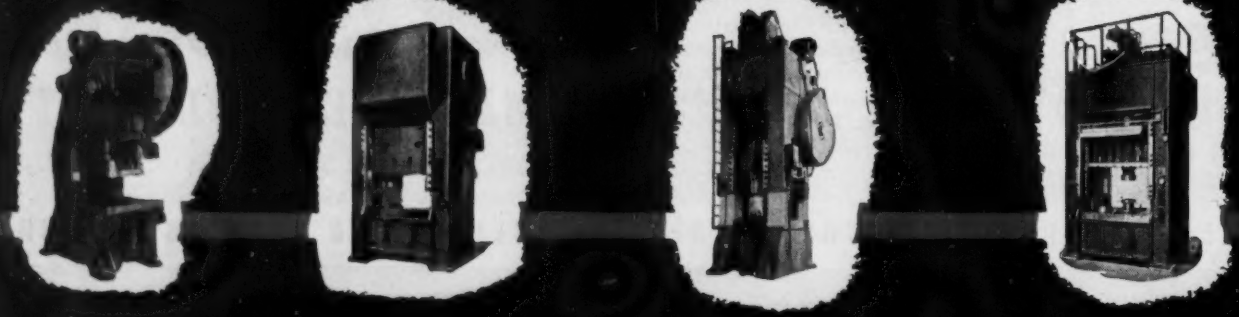
RIGIDMILS • AUTOMATIC LATHES • SPECIAL MILLING AND TURNING MACHINES

Here's your Verson MARK

This huge Verson automatic, transfer feed press performs 5 operations simultaneously on brake drum disks. Stock is fed into the right hand side of the press and formed brake drum disks discharged at the left.



is pushing back the frontiers of metal forming

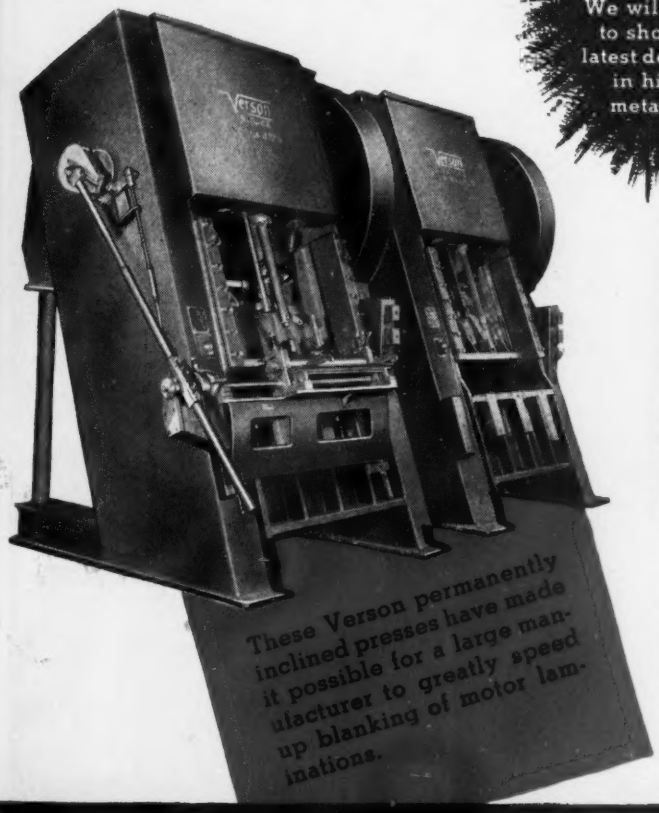
The origination by Dave and John Verson of the allsteel welded frame over 25 years ago marked the beginning of a new era in the press forming of metals. Using this revolutionary method of construction as the foundation, Verson has led the way in the development of more efficient machines to produce better products faster and at lower unit cost. Completely automatic operation has been combined with ingenious handling methods to permit manufacturing economies never before dreamed possible. We are daily expanding the scope of applications for these modern production methods. Many products which must now be produced individually will soon be made on high production presses at almost unbelievable rates.

We would welcome the opportunity to discuss your stamping problems with you and show you how high speed methods can be adapted to the manufacture of your product.

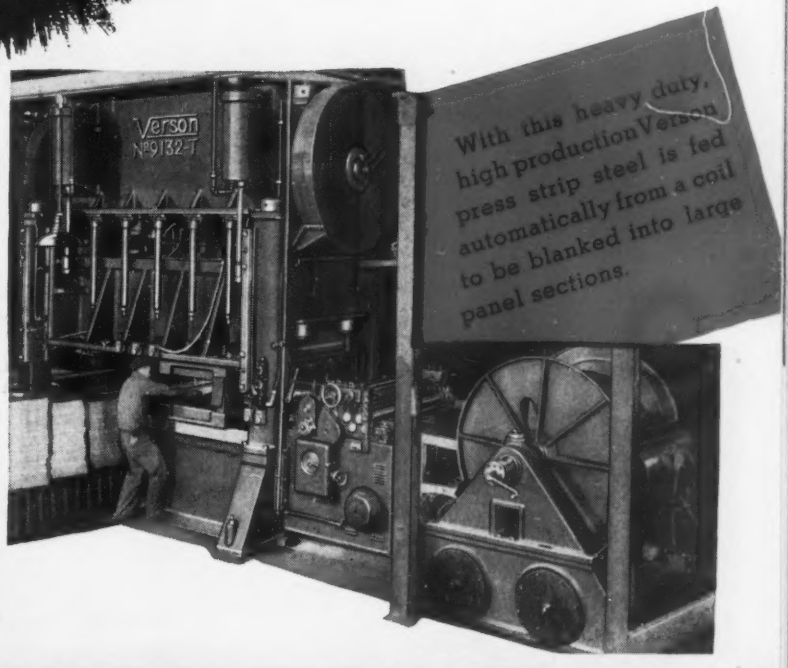
MANUFACTURE FOR LESS WITH VERSON EQUIPMENT.

VERSON ALLSTEEL PRESS CO.
9318 S. Kenwood Ave., Chicago, Ill.

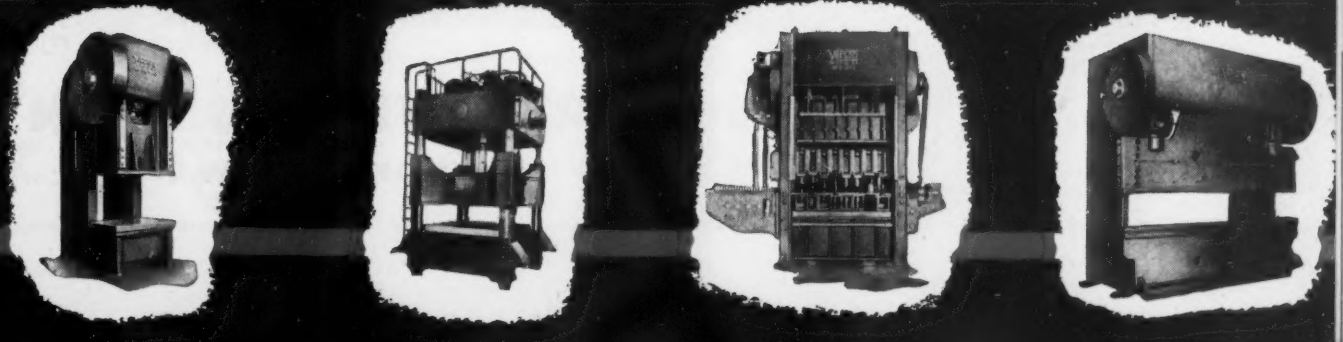
While you're in Chicago for the National Metal Congress, be sure and visit the Verson Plant. We will be pleased to show you the latest developments in high speed metal forming.



These Verson permanently inclined presses have made it possible for a large manufacturer to greatly speed up blanking of motor laminations.



With this heavy duty, high production Verson press strip steel is fed automatically from a coil to be blanked into large panel sections.



GREAT HEADS

Benjamin Franklin—Statesman extraordinary, Scientist, Inventor, Philosopher, Writer, Craftsman—and a great American.

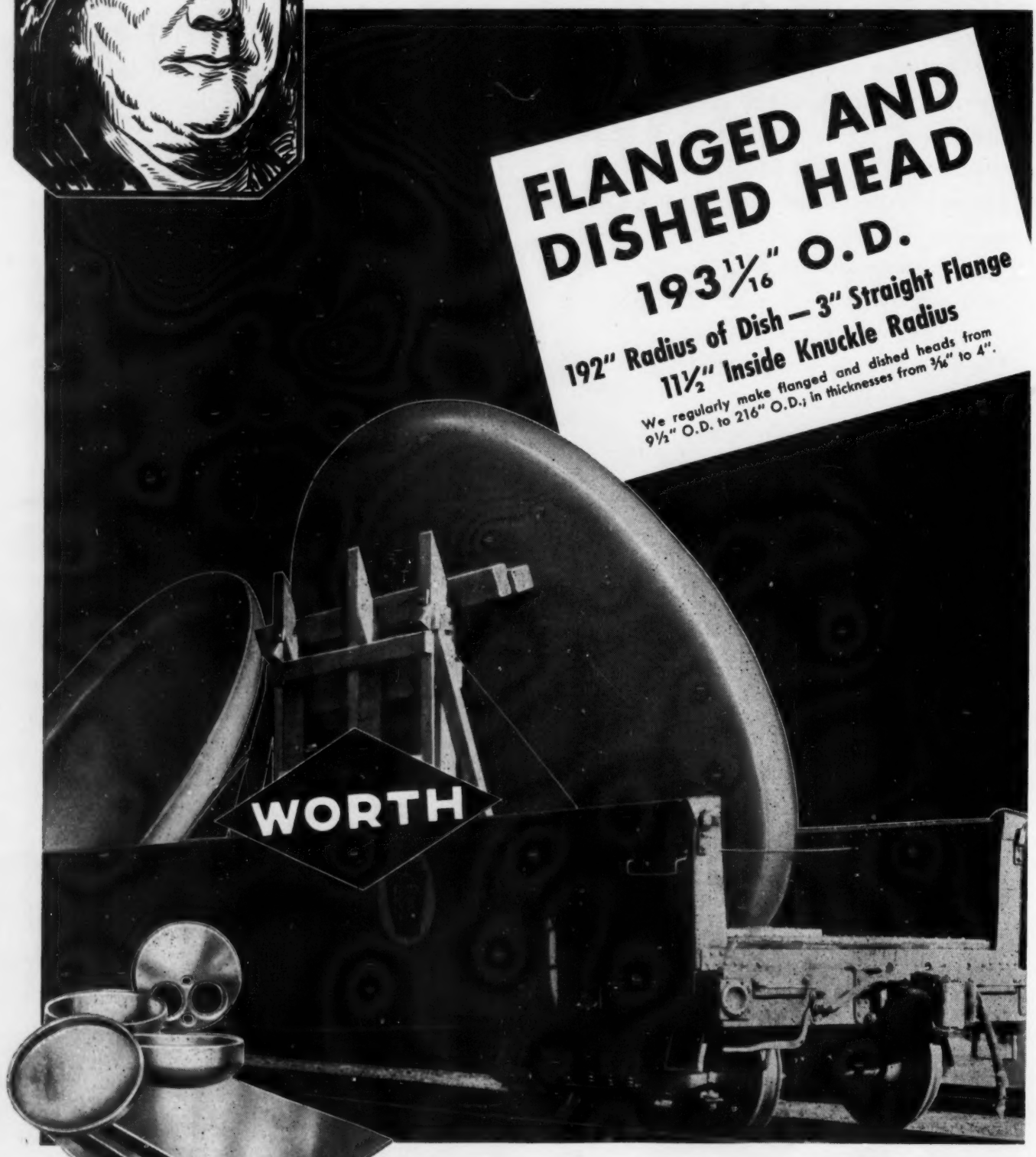
FLANGED AND DISHED HEAD

193 11/16" O.D.

192" Radius of Dish — 3" Straight Flange

11½" Inside Knuckle Radius

We regularly make flanged and dished heads from 9½" O.D. to 216" O.D., in thicknesses from 3/16" to 4".



WORTH STEEL COMPANY

CLAYMONT-DELAWARE

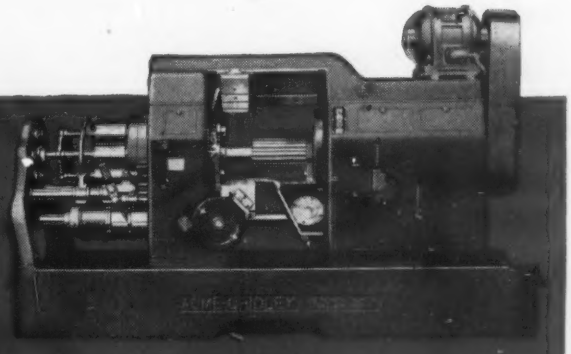
FOR BIG ONES

ACTUAL SIZE

OR LITTLE ONES

ACTUAL SIZE

THIS MACHINE WILL GIVE YOU FINE FINISHES *FASTER*

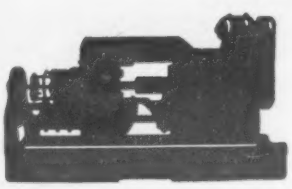


To meet today's rising production costs and still show a profit takes more than men, machines and materials.

Time is the big factor.

And that's where we can help you. If you're paying good money for finishing operations after parts leave the automatic, we can show you how to cut costs—without cutting quality.

Acme-Gridleys have the stamina for fine tolerances at high speed—and the versatility of tooling methods that eliminate many secondary machining operations. Examine the job facts listed—then ask us to show you how Acme-Gridley timesaving methods can be applied to your production jobs.



ACME-GRIDLEY BAR and CHUCKING AUTOMATICS maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

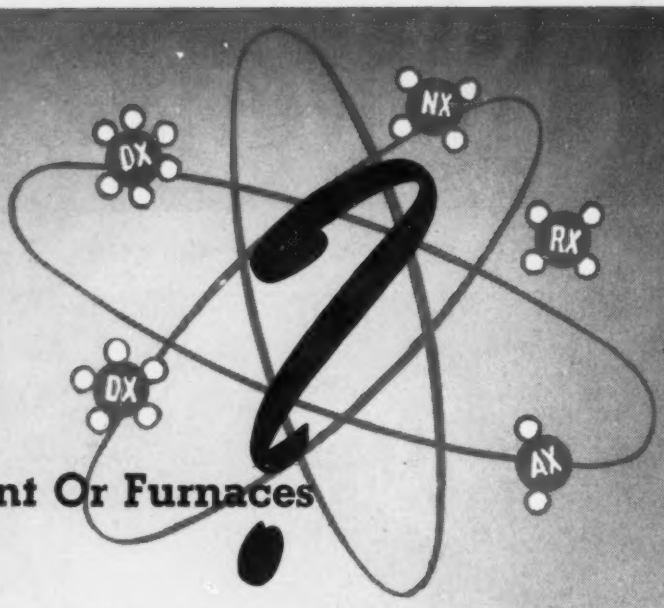
JOB FACTS

1 The big part is an automotive steering stud. Machine time is 40 pieces per hour, for eleven operations, including shaving ball and taper, and threading with ground-thread circular-chaser Vers-O-Tool. 2" dia. x 6½" long —SAE 4620 steel.

2 The little part is a telephone receiver shaft. Machine time is 800 pieces per hour, for eleven operations, including milling the flats, knurling, and shaving the bearing ends to within .001" limits. 9/32" dia. x ¾" long —steel.

THE NATIONAL ACME COMPANY

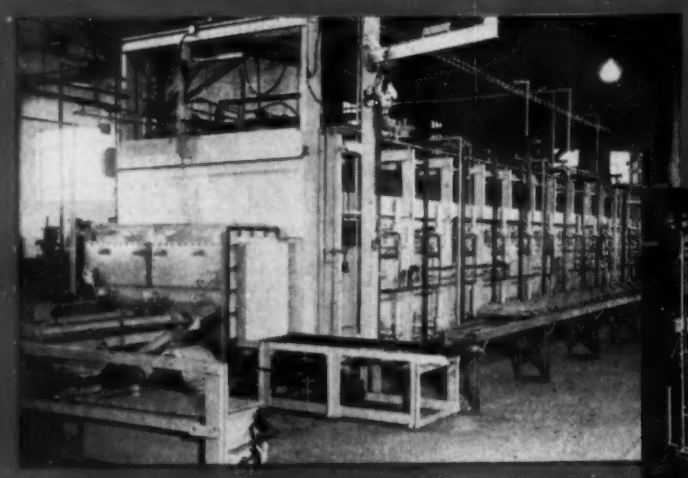
170 EAST 131st STREET · CLEVELAND 8, OHIO



Any Questions On The Science Of Gas Chemistry, Heat Treatment Or Furnaces

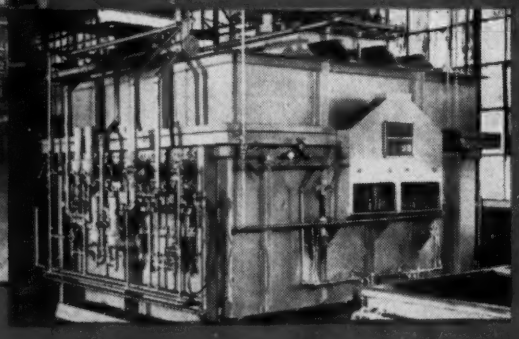
Progress in heat treat practice and the equipment which makes it possible is moving at a rapid pace; for instance Radiant tube heating, carefully controlled furnace atmosphere with new improved furnace design—all 'Surface' developments. These result in improved product and greater economy in production.

Some of the 'Surface' engineers responsible for these significant developments will be available in our booth No. 617 (Arena) at the Metals Exposition, International Amphitheatre, Chicago. We would like to have you meet them. Ask questions. Discuss your problems, get their views and take advantage of their special experience. You will be most welcome.



SC Continuous Tray Pusher
Radiant Tube Furnace

'Surface' Rotary Hearth Type Furnace
Radiant Tube Heated



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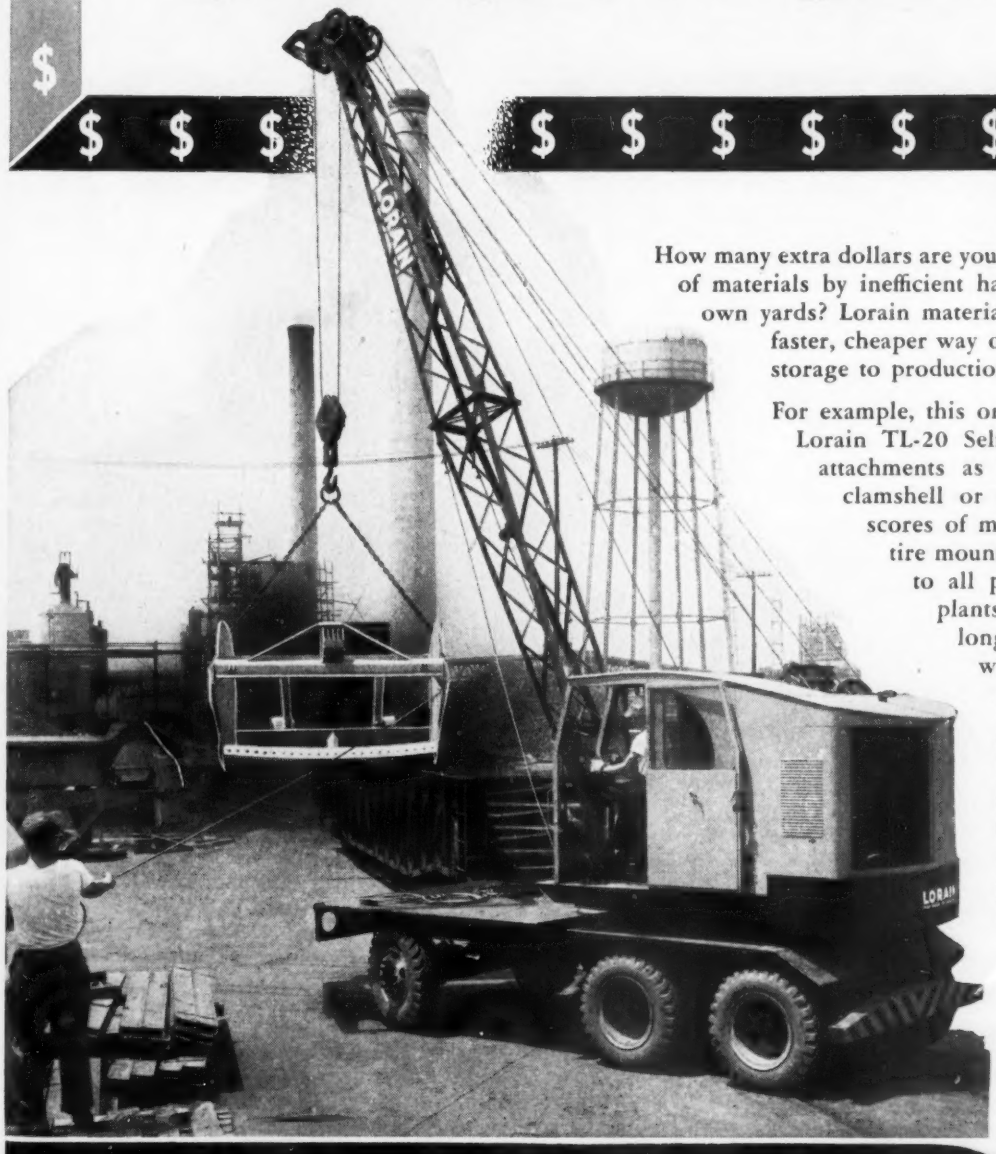
2822

'Surface'

SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

LORAIN "CRANEPOWER" can improve your profit picture



How many extra dollars are you adding to the already high cost of materials by inefficient handling methods right in your own yards? Lorain material handling Cranes offer you a faster, cheaper way of hustling materials from yard storage to production line.

For example, this one-man operated, single-engine Lorain TL-20 Self-Propelled Crane, using such attachments as hook, sling, electric magnet, clamshell or dragline bucket, can perform scores of material handling jobs. Rubber-tire mounting permits fast shuttle service to all parts of the yards or between plants. Its working day is 24 hours long and its efficiency never varies with the hour or the weather.

The Lorain line of rubber-tire and crawler mounted cranes offers a size and type for every industrial requirement. Why not modernize and mechanize with cost-cutting "Cranepower"? See your local Thew-Lorain distributor for complete information.

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THE THEW SHOVEL CO.
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One HOMESTEAD 4-WAY VALVE WILL DO...

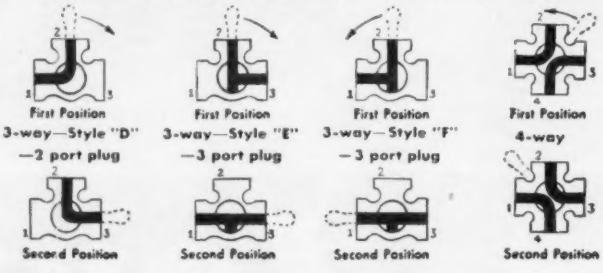
YOU WILL SAVE THE COST OF *Two*

ONE Homestead 4-Way Quarter-Turn Valve will do the work of three ordinary shut-off valves when used as a fluid "flow changer" or as a "switching" valve. Homestead 4-Way Valves are also ideal for use as operating valves to control single or double acting pistons that travel the full length of their stroke. Their use thus saves initial valve and installation costs, cuts operating time, reduces maintenance expense. Added advantages are the long, trouble-free operation and dependable service typical of all Homestead Valves.

Homestead 3-Way or 4-Way Valves can be furnished in sizes ½" to 12", in brass, acid-resisting bronze, semisteel, steel, monel, Ni-Resist and other alloys for specific temperature, pressure and fluid conditions.

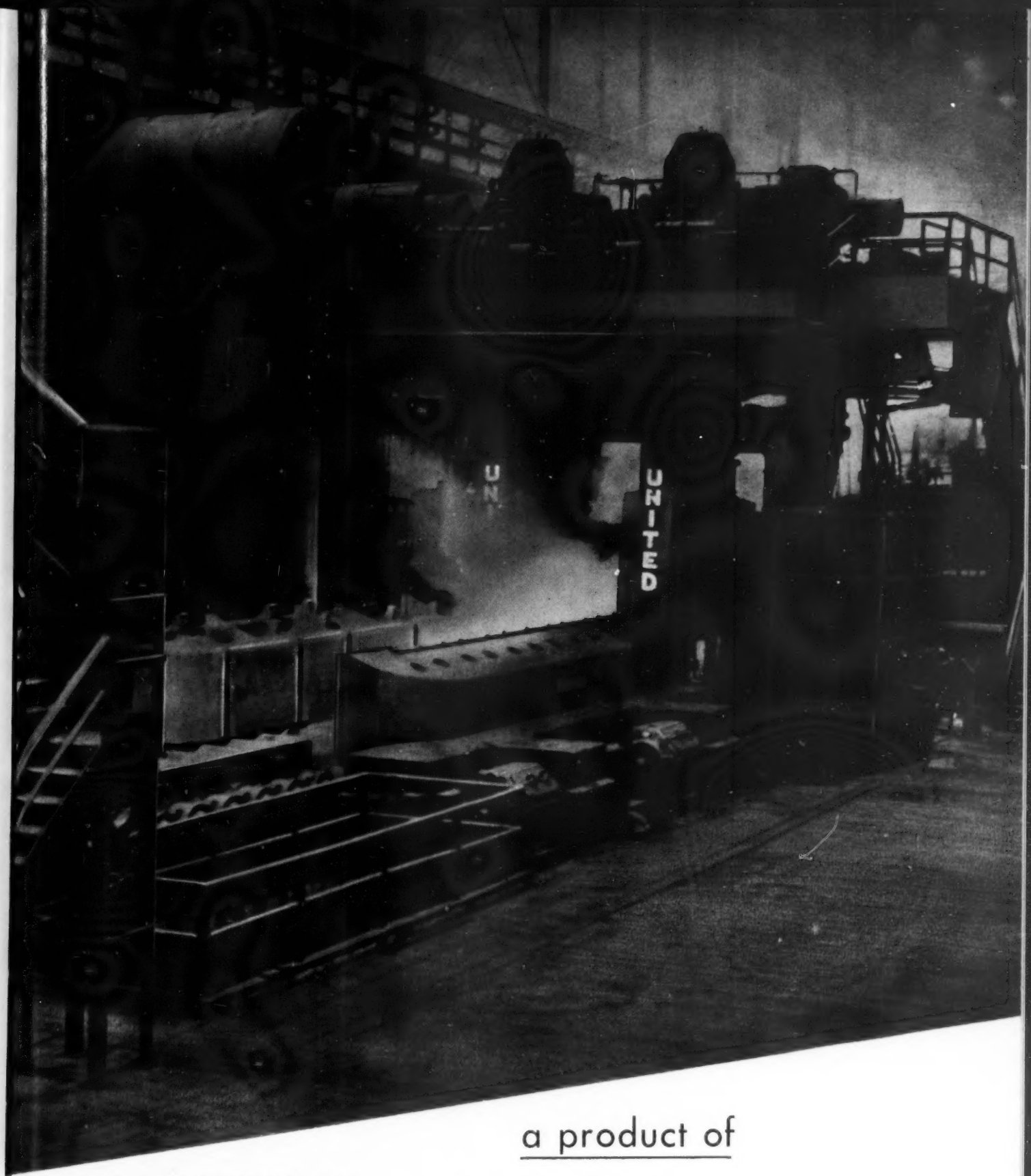
Write today for complete information and copy of Valve Reference Book No. 38.

FLUID FLOW-LINES SHOW HOW YOU CAN USE HOMESTEAD 3-WAY AND 4-WAY VALVES



HOMESTEAD VALVE MFG. CO.

P. O. BOX NO. 22 CORAOPOLIS, PA.



45 inch Reversing Slabbing Mill which recently broke all world's records by producing 159,792 tons of steel slabs in one month.

a product of

UNITED

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DESIGNERS AND MAKERS OF ROLLS AND ROLLING MILL EQUIPMENT

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BAKER & ADAMSON *Announces*

Another Advancement in Packaging

B&A HYDROFLUORIC ACID, *Reagent A.C.S.*

Exclusive *SAFTEPAK*† PLASTIC BOTTLE
maximum utility • maximum safety

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882
B·A
STANDARD OF PURITY
ACID HYDROFLUORIC
Reagent 48% Code 1100
GENERAL CHEMICAL COMPANY
NEW YORK, N. Y., U. S. A.

Two years ago, Baker & Adamson pioneered plastic containers for its Reagent A. C. S. Hydrofluoric Acid. Thus, it eliminated for all time the hazardous old-fashioned wax bottle for HF so long in use by the chemical industry. This package met with immediate success and widespread acceptance, for it answered a long-felt need of laboratory chemists.

Now, with new advancements in plastics themselves, Baker & Adamson has developed a still finer container—its exclusive new *Saftepak* bottle. This offers the combination of special pouring and sealing features outlined, which provide maximum utility and protection in laboratory use. Study them carefully, then order your Reagent HF requirements from B&A today . . . and be among the first to enjoy the advantages of the exclusive *Saftepak*. It is readily available from convenient shipping points, coast to coast.

† Trade Mark, General Chemical Co.

1 Outstanding Pouring Control

Now pours drops, needle stream, or full flow, depending on your requirements.

Accurate measure . . . "siphon-action" pour-out draws back into bottle any drops clinging to lip when pouring stops.

Translucent . . . acid level always visible.

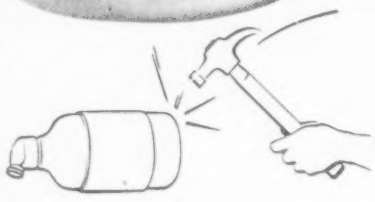
Easy to handle . . . the *Saftepak* with its sturdy encircling label band fits conveniently into your hand for easy pouring.

2 Acid Resistant

Entire unit made of special plastic highly resistant to aqueous HF.

3 Shatter-Proof

Bottle is pressure molded of shatter-proof plastic . . . does not become brittle, crack or break as do ordinary wax containers. Will not shatter or smash even under heavy impact.



4 Screw-Tight Cap

Provides easy reclosure; safeguards against possible spillage or leakage; protects Reagent A. C. S. purity of the acid.

REAGENTS
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FINE CHEMICALS

GENERAL CHEMICAL COMPANY

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SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

* Complete stocks carried here.

LODGE & SHIPLEY LATHES at work...

AT HUFFORD MACHINE WORKS, Inc.

"IDEAL FOR MACHINING EXTREMELY CLOSE TOLERANCES ... OPERATORS LIKE IT"

"OUTPUT UP 14%"
•
"ACCURACY UP 21%"
"TIME SAVED 17%"

"Being built so sturdy and accurate," comments a Hufford executive, "the Lodge & Shipley Lathe is ideal for machining parts whose end use calls for extremely close tolerances."

In the production of hydraulic presses and other precision machinery, this well-known California manufacturer finds Lodge & Shipley Lathes fill the bill . . . with profit! On the 18" Lodge & Shipley Engine Lathe shown above, alloy steels, brass and aluminum are fashioned into hydraulic cylinders, pistons and heads.

Turning, facing, boring and threading operations are performed using the full range of speeds and feeds available on this modern machine with the latest in carbide tipped and high speed steel tools.

You too, will find Lodge & Shipley Lathes ideal for machining parts of widely varied nature. Call on your near-by Lodge & Shipley Representative for complete details or write for Condensed Catalog showing the complete Lodge & Shipley line.

THE **Lodge & Shipley** COMPANY

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MACHINE TOOL DIVISION • 3055 COLERAIN
SPECIAL PRODUCTS DIVISION • 800 EVANS ST.

THE WORLD OVER KNOWN FOR GOOD LATHES ONLY L&S LATHES

You get plenty of power from easily-held, smooth-running *CLECO GRINDERS*

FROM "snagging" in the cleaning room to light finishing on forgings, dies, etc., you will find the *right* model for *every* job in the extensive line of Cleco Rotary Grinders. These grinders feature rugged alloy steel rotors, heat treated and ground to exact size — insuring vibration free operation at all speeds. Governors efficiently control the speed, whether idling or under varying loads, providing ample power at all times plus utmost economy in air consumption. Highest grade ball bearings are used throughout. An efficient lubrication system helps increase the life of the tools. Bulletin 80 describes Cleco Grinders in detail and includes a large blueprint of construction details. *Ask for it!*

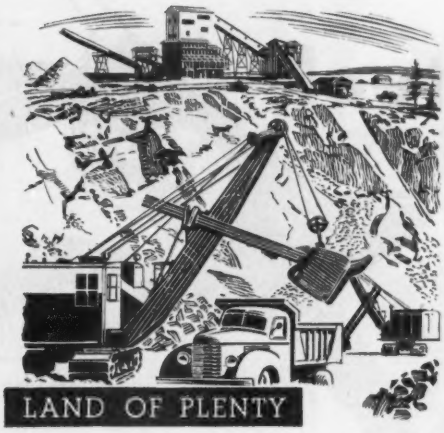
CLECO DIVISION
of THE REED ROLLER BIT COMPANY
P. O. Box 2119 Houston 1, Texas

Heavy Duty Model 845S
Light Grinders, Models 214J and 9G
Vertical Grinder, Model 1460, with flexible pad and abrasive disc.
Write for Bulletin 80!
Light Grinder, Model 214

THE STORY OF SILICON

EARLY START IN LIFE

1 Way back in the Stone Age are found the first uses of silicon—in the tools and weapons used by prehistoric man. These were made of flint, which is almost pure silica, and in silica many centuries later the Swedish chemist Berzelius discovered the element silicon. He produced the world's first ferrosilicon in 1810.

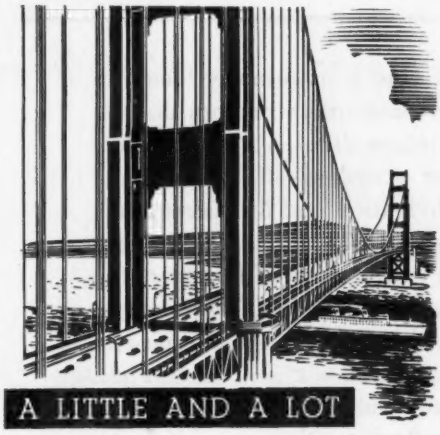


LAND OF PLENTY

2 "Earth former" is what silicon has been called, for it is present in most all rocks, clays, soils, and many semi-precious stones. More than one fourth the earth's crust is silicon—the most abundant element, next to oxygen. Electromet digs into mountain after mountain for high-quality silicon ore.

HOUSECLEANING SPECIALIST

3 Silicon does a "clean-up job" in iron and steel production, serving as scavenger and deoxidizer. From the molten bath it removes harmful oxides and gases. Silicon is used for refining practically all alloy steels and many grades of carbon steel. It is second only to manganese in its usefulness in steelmaking.



A LITTLE AND A LOT

4 From about 0.20 to 1.50 per cent silicon goes into many structural steels —such as those used for highly stressed parts of bridges. In larger percentage, sometimes as much as 17 per cent, silicon equips cast irons to handle highly corrosive acids in chemical plants. Silicon is also a softener in cast iron.

MAGNETIC PERSONALITY

5 The heart of the mysterious transformer is made of steel containing silicon. Silicon is essential in sheet steel for electromagnets, generators, and other electrical apparatus because of the special magnetic and electrical properties it imparts to the steel. It has brought about tremendous power savings.

Cream Of The Crop

Electromet's interest in silicon dates back almost 50 years, for in 1898 the broad patent claims of de Chalmot were assigned to the Willson Aluminum Company, one of the predecessors of Electro Metallurgical Company. With its long experience in ferro-alloys production, Electromet naturally knows how to give all its customers alloys of high quality and purity. Write for the booklet "Electromet Products and Service," which will tell you more about silicon and the other Electromet alloys.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

ELECTROMET Ferro-Alloys and Metals are sold by Electro Metallurgical Sales Corporation, and Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

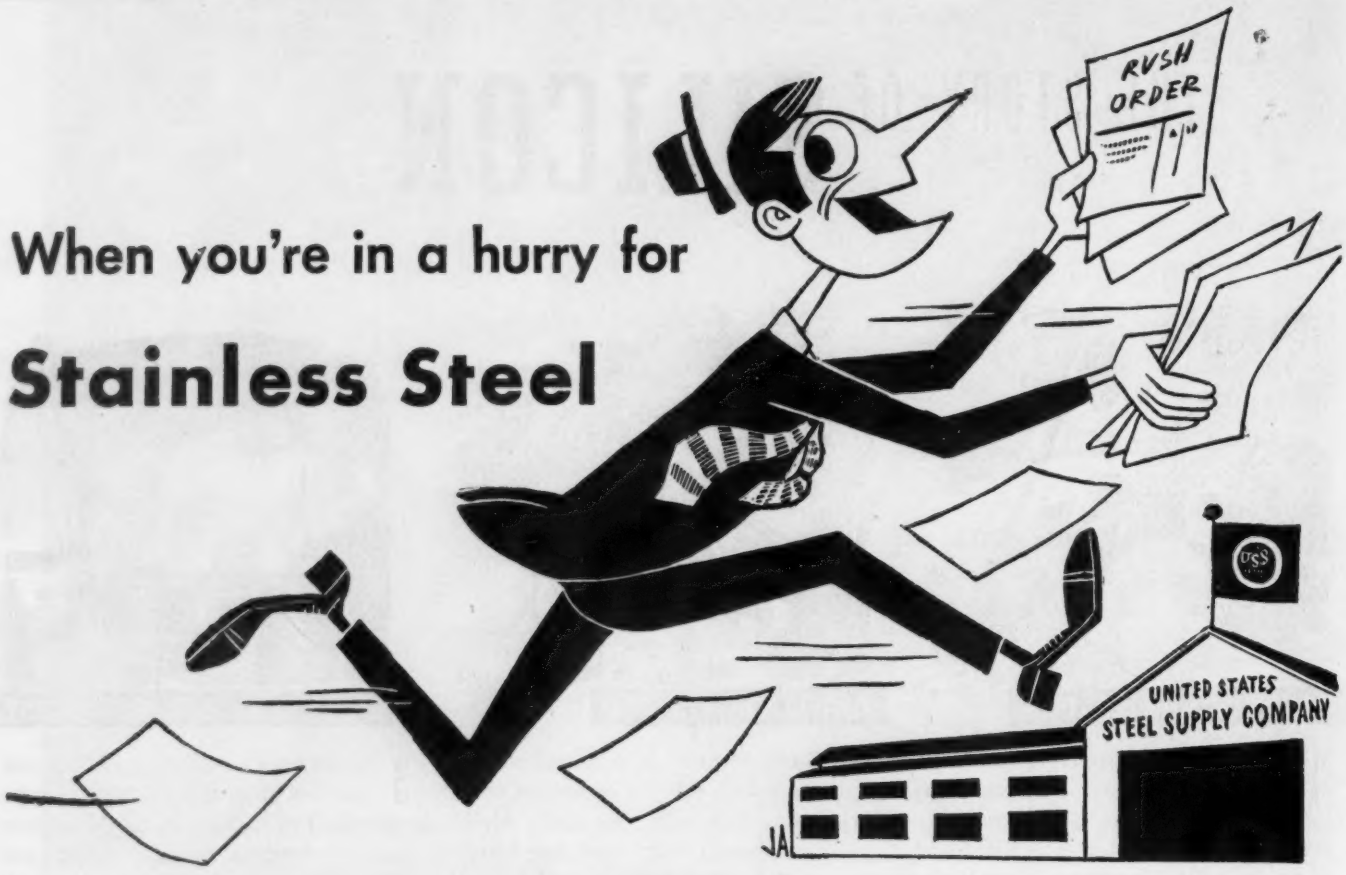
Electromet

TRADE-MARK

Ferro-Alloys & Metals

When you're in a hurry for

Stainless Steel



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UNITED STATES STEEL SUPPLY COMPANY
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NOW, from our nine conveniently located warehouses, we can make prompt deliveries of U·S·S Stainless Steel. While it costs no more than other stainless steels—its use assures uniform fabrication and the finest performance in service. So, if you need Stainless Steel quickly—or if you require High Strength Steels, Alloy Steels, Carbon Steels, Machinery, etc., get in touch with our warehouse nearest you.

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UNITED STATES STEEL

BWH
BOSTON WOVEN HOSE & RUBBER COMPANY
DEPENDABLE RUGGEDNESS
Tough abrasion-resisting rubber covers and edges
Anti-mildew treated heavy duck (usually 42 oz.)

TOUGH UNDERCOVER JOB BRINGS NEW RECORDS TO LIGHT

Another top performance by a BWH product

Far below ground in a Pennsylvania coal mine, this conveyor belt had to take punishment, and then some. The installation involved right-angle feed, tandem drive and lopsided distribution of heavy loads. And dark, damp operating conditions made the belt an ideal incubator for mildew spores, whose growth inevitably cause deterioration.

A BWH Colliery King Belt was installed, mildew-inhibited by a special process developed by BWH technologists. Because it is produced by the exclusive ROTOCURE method of continuous vulcanization which eliminates weak spots caused by press overlaps, the Colliery King has powerful endurance. As a result, it did a record-making job in this mine, at minimum maintenance cost.

This "know how" in producing conveyor belts of extraordinary toughness is one reason why BWH is known throughout industry for its high achievements. Whatever your needs in rubber goods, look to BWH for dependable ruggedness . . . to BWH distributors for dependable service.

HAVE YOU A PROBLEM WHERE STAMINA COUNTS?

Bring us your toughest problems . . . we're specialists in solving them. Consult your nearest BWH distributor, or write us direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all principal cities

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One Glance Tells You that

Only the SIDE of a V-Belt TOUCHES the Pulley

Diagram of V-Belt in Sheave Groove

The *SIDE* Does ALL the GRIPPING That's Why it *GETS the WEAR!*

One glance at a V-Belt in its sheave shows you that only the sides of the belt *touch the pulley.* Every ounce of load the V-Belt carries must first be picked up by the sides. The sides do all the *gripping*—they get all the *wear* against the sheave groove wall. They pick up the load. They transmit that load to the belt as a whole. Then, once again, the sides—and the sides *alone*—grip the driven pulley and deliver the power to it.

Naturally, this explains why you have always noticed that the sidewall of the *ordinary* V-Belt is the part that *wears out first.*

★*Now See How the Patented CONCAVE SIDE SAVES Sidewall Wear—Lengthens Belt Life!*

Because the life of a V-Belt depends, first of all, on the sidewall, it is clear that anything which prolongs the life of the sidewall will lengthen the life of the belt. The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

★*Longer Sidewall Wear* Is MORE IMPORTANT NOW Than Ever Before!

Now that Gates *SPECIALIZED* Research has resulted in Super V-Belts capable of carrying much heavier loads—up to 40% *higher horsepower ratings* in some cases—the sidewall of the belt is called upon to do even *more work* in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important NOW than ever before!

4710

The CONCAVE SIDE is a GATES PATENT

Straight Sided V-Belt

Fig. 1

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

Fig. 1-A

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall

Fig. 2

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley.

Fig. 2-A

No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

THE GATES RUBBER COMPANY DENVER, U. S. A., *"World's Largest Makers of V-Belts"*

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

Gates

THE MARK OF SPECIALIZED RESEARCH

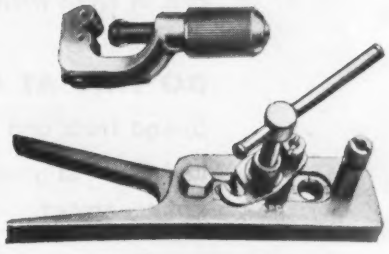
Like a powerful magnet, **'Superior' is proving a real attraction to the many manufacturers and servicemen who demand a better tubing buy.**

A definite drawing power in its field, 'Superior' has come to symbolize copper tubing at its best, whether in straight lengths or coils 1″ (O.D.) to capillary .093″ (O.D.)

A large part of 'Superiors' pull in the tubing market is due to the fact that it is four ways better: is clean and bright, easy bending, seamless and really dry.

After summing up these product advantages, you, too, will want to say 'Superior' when specifications call for the 'tops' in copper tubing. Write Today for full details and colorful literature.

PENN TUBING IS "SUPERIOR"



"Superior"

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For Flaring & Cutting

New, Different & Better

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THE STEEL . . . .
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TO LOWER YOUR PRODUCTION COSTS!

OUR PRODUCTION EXPERT WILL SHOW YOU, IN YOUR OWN PLANT, HOW

SPEED TREAT STEEL

MEDIUM HIGH CARBON FOR HEAT TREATING

WILL increase your production 30 to 50% by faster machining, reducing scrap losses, warpage and breakage. He will show you how to set up your machine tools for this steel to improve your product and its finish while lengthening tool life 3 to 4 times.

DO THIS AT OUR EXPENSE . . . Write us for samples of Speed Treat and Speed Case Steel. Our Production Expert will follow them to your plant and make his demonstration. Investigate SPEED TREAT . . . you can't lose!

VISIT OUR EXHIBIT — METAL SHOW CHICAGO Oct. 18-24 — BOOTH No. 1150

SPEED CASE STEEL
LOW CARBON OPEN HEARTH FOR CARBURIZING.

ASK FOR THE SERVICES OF OUR PRODUCTION EXPERT

Tear off here — **ATTACH TO YOUR LETTERHEAD AND MAIL TO EITHER COMPANY BELOW**

Licensor
MONARCH STEEL COMPANY
HAMMOND · INDIANAPOLIS · CHICAGO
PECKOVER'S LTD. Toronto, Canadian Distributor

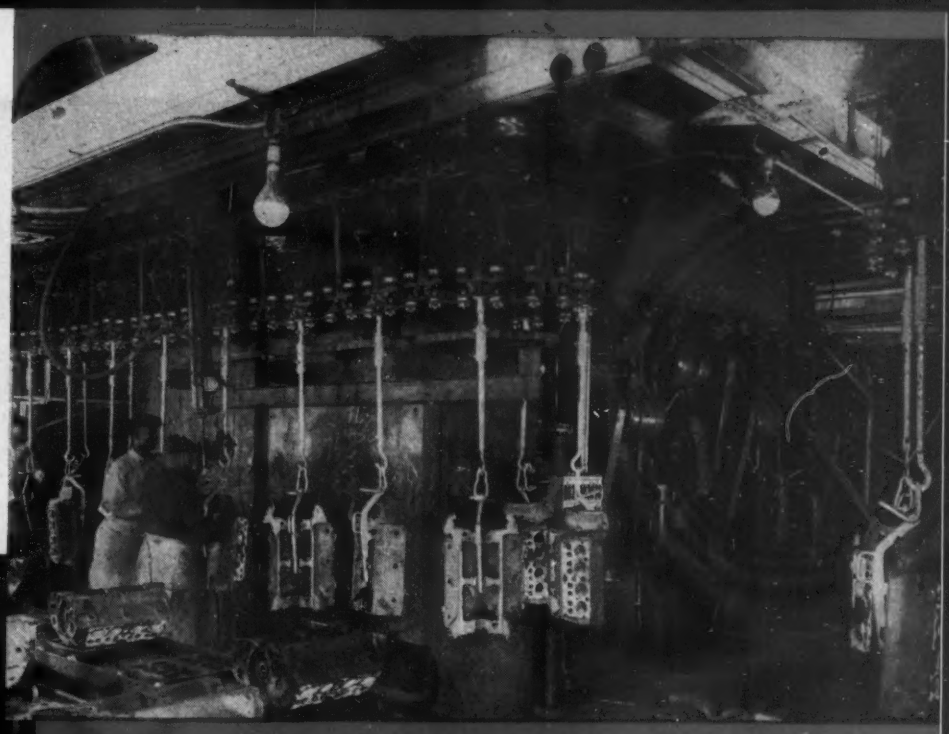
MANUFACTURERS OF A COMPLETE LINE OF COLD FINISHED CARBON AND ALLOY STEEL BARS

The Licensee for Eastern States
FITZSIMONS STEEL COMPANY
YOUNGSTOWN, OHIO

ACTUAL PHOTOGRAPH
Speed Case Steel (.20 carbon) 1 inch cold drawn bar tied in a knot, cold, without fracture.

WORK RUNS TO CLEANING STATION...WALKS THROUGH BLAST STREAM

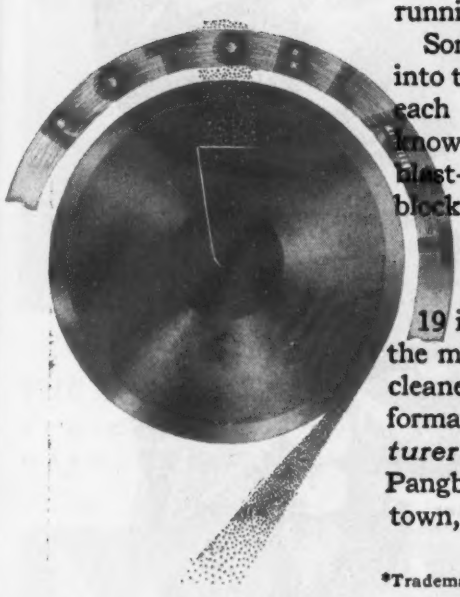
The Pangborn-designed Two-Speed Conveyor brings the work up to the cleaning station *fast* . . . and moves it *slowly* through the blast stream . . . then *hurries* it to the next station. Since the work advances and turns at the same time, all sides of the recesses are completely exposed to the blast stream for effective, uniform cleaning. One pass through cleans the casting.



"BOY SCOUT PACE" HELPS FAMOUS AUTO-MAKER TO Speed Blast Cleaning 44%

You remember the Boy Scout pace — so many steps running, so many steps walking.

Something like that — a Two-Speed Conveyor — built into three new special Pangborn ROTOBLAST* Cabinets, each with five ROTOBLAST units, is helping a well-known automotive manufacturer to increase the rate of blast-cleaning cylinder blocks by 44% — a total of 720 blocks per hour — with a corresponding decrease in costs.



19 AUTO PLANTS USE ROTOBLAST

19 installations (totalling 76 ROTOBLAST units) help the motor makers to save time, increase output, produce cleaner metal, facilitate inspection and finishing. For information write Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment.* Pangborn Corporation, 1298 Pangborn Boulevard, Hagerstown, Maryland.

*Trademark of the Pangborn Corporation.

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

BLAST CLEANS CHEAPER WITH THE RIGHT EQUIPMENT FOR EVERY JOB

COME TO PANGBORN EXHIBIT AT NATIONAL METAL EXPOSITION OCT. 18 TO 24—BOOTH 409

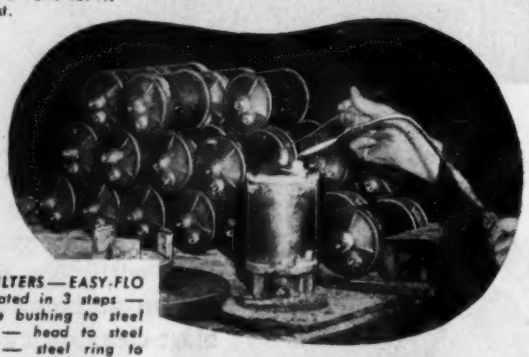
SIL-FOS EASY-FLO STARS OF AN *Amazing* INDUSTRY-WIDE "METAL JOINING SHOW"

If the hundreds of products now made with the low-temperature silver brazing alloys, EASY-FLO and SIL-FOS were assembled in one place, you would see a truly amazing display — amazing in its range and variety — but most amazing in the *extent to which EASY-FLO and SIL-FOS brazing boosted production and slashed costs* in practically every case.

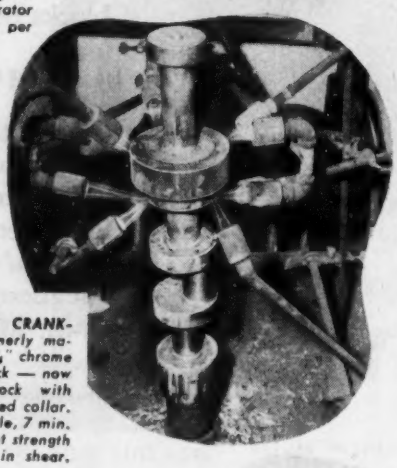
What's more, you would find nothing sacrificed in getting these results. On the contrary, product improvement is the rule — first, because EASY-FLO and SIL-FOS brazing makes assemblies that *equal or exceed the solid metal in strength, leak-tightness and all other essential properties* — and secondly, because EASY-FLO and SIL-FOS brazing *permits streamlined designs which can be produced with big-scale savings in man-hours, machine-hours and metals.*

INVESTIGATE this proven way to raise production and cut costs. Find out where and how it fits into your production. We'll be glad to send a field engineer to help you get the answer. Send for *BULLETINS 12-A and 15.* They'll give you full EASY-FLO and SIL-FOS facts. Write for them today.

UNIVERSAL JOINT — *forged yoke EASY-FLO brazed to steel sleeve with induction heating — One operator does 655 per 8 hours — Every joint gets a 1540 lb.-ft. torque test.*



OIL FILTERS — *EASY-FLO fabricated in 3 steps — bronze bushing to steel head — head to steel shell — steel ring to shell — Each operator averages 110 units per 8 hours.*



PUNCH PRESS CRANKSHAFT — *Formerly machined from 5¾" chrome nickel steel stock — now from 4½" stock with EASY-FLO brazed collar. Gas brazing cycle, 7 min. 35 secs. — Joint strength rated 92 tons in shear.*

AT THE CHICAGO METAL SHOW
BOOTH 150 See our live exhibit including a production brazing job in action, torch brazing demonstrations, examples of work from many industries and "before" and "after" brazing case histories. Experienced engineers will be in attendance to discuss metal joining problems with you.

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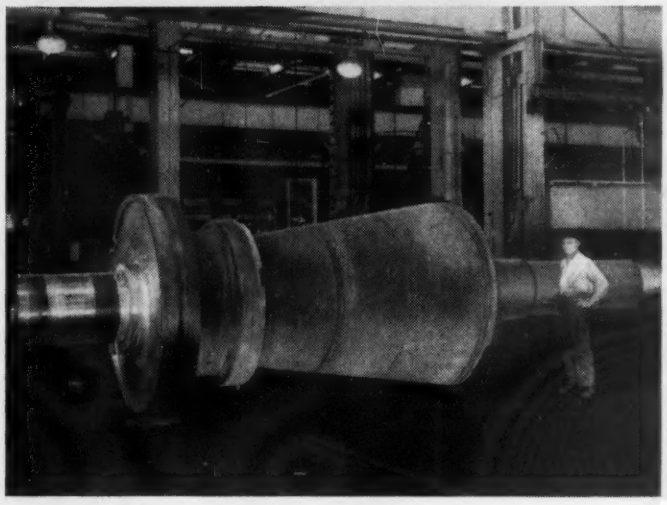
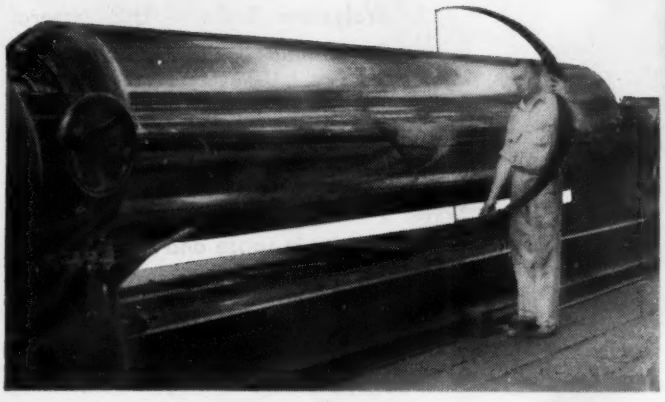
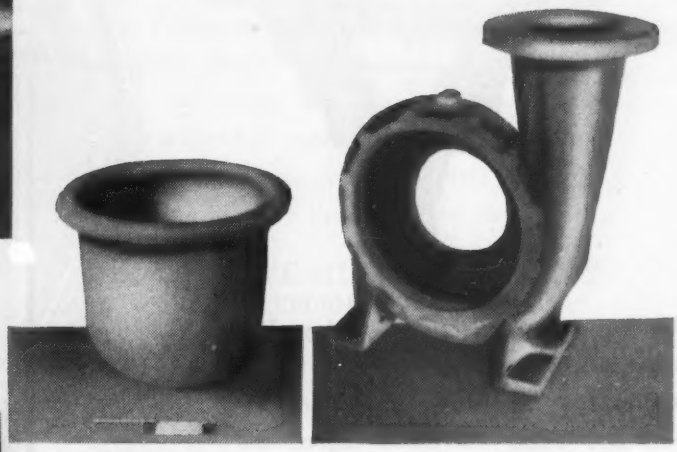
A FEW OF TODAY'S EASY-FLO AND SIL-FOS BRAZED PRODUCTS

Aircraft	Bus Bars	Gasoline Lamps	Lighting Fixtures	Motors	Refrigerators	Stampings	Tractors
Aircraft Accessories	Electrical Appliances	Gasoline Stoves	Locomotives	Paper Cup Holders	Refrigeration Equipment	Switchboards	Transformers
Automobiles	Electrical Connections	Heating Equipment	Machinery	Pipe and Tubing	Refrigeration Piping	Switch Boxes	Universal Joints
Automobile Accessories	Electrical Contacts	Instruments	Marine Equipment	Pots and Pans	Ships Piping	Tool Repairs	Washing Machines
Bicycles	Electrical Equipment	Lawn Mowers	Metal Furniture	Radios	Spark Plugs	Tool Tipping	





You are cordially invited to visit our Booth at the Metal Show, Chicago, October 18 to 24, Space #329.



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STAINLESS AND TOOL STEEL BARS

•

CORROSION AND HEAT RESISTING CASTINGS

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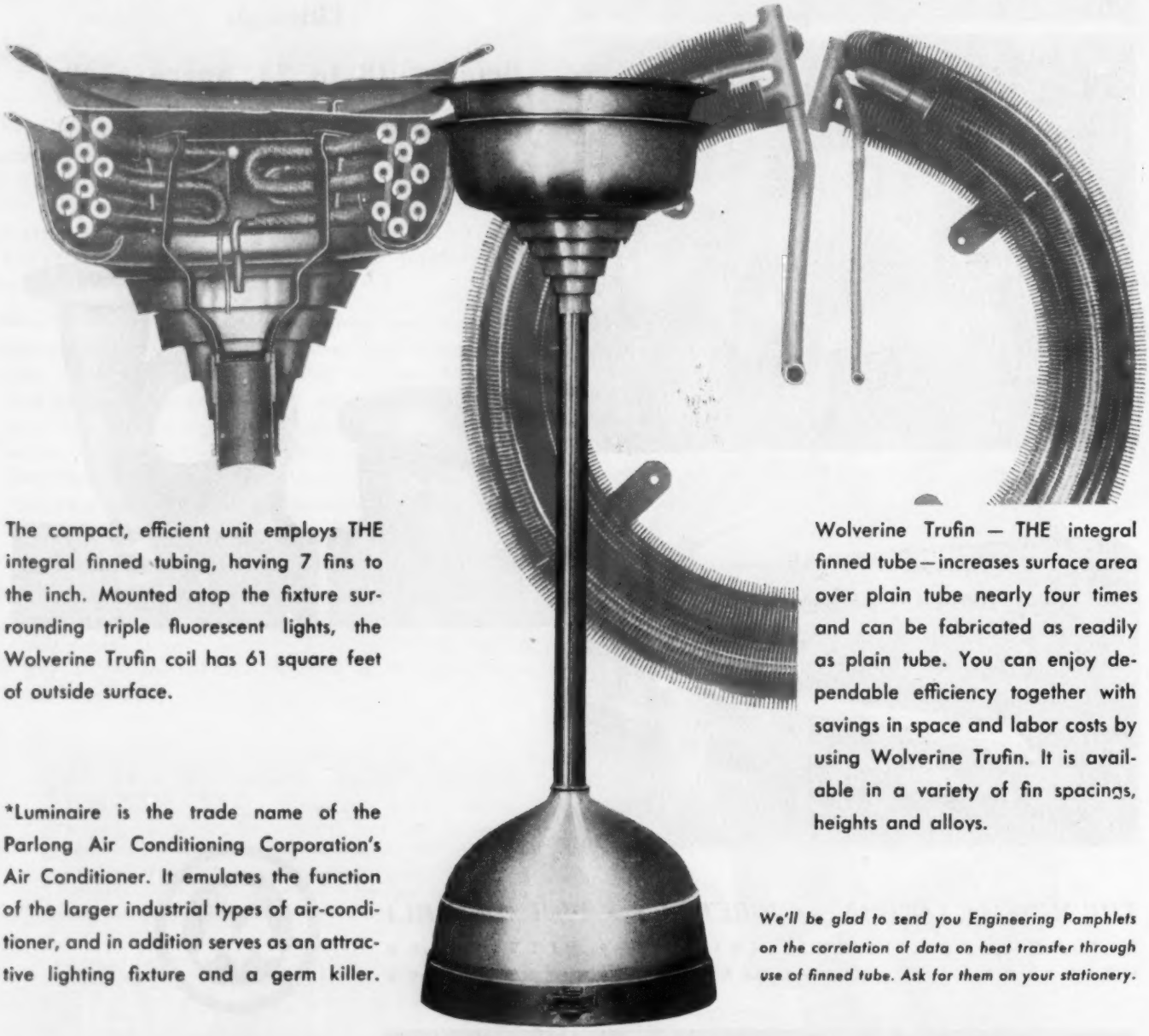
FORGINGS AND RINGS

WOLVERINE TRUFIN

Cools The Air In The New Luminaire*

Again, Wolverine Trufin, THE integral finned tube, demonstrates its pronounced versatility! In this instance it forms a substantial part in a unique appliance — the Luminaire Conditioner. Formed into a coil, Trufin serves as the evaporator for the unit for cooling and dehumidifying the air.



The compact, efficient unit employs THE integral finned tubing, having 7 fins to the inch. Mounted atop the fixture surrounding triple fluorescent lights, the Wolverine Trufin coil has 61 square feet of outside surface.

*Luminaire is the trade name of the Parlong Air Conditioning Corporation's Air Conditioner. It emulates the function of the larger industrial types of air-conditioner, and in addition serves as an attractive lighting fixture and a germ killer.

Wolverine Trufin — THE integral finned tube—increases surface area over plain tube nearly four times and can be fabricated as readily as plain tube. You can enjoy dependable efficiency together with savings in space and labor costs by using Wolverine Trufin. It is available in a variety of fin spacings, heights and alloys.

We'll be glad to send you Engineering Pamphlets on the correlation of data on heat transfer through use of finned tube. Ask for them on your stationery.

WOLVERINE TUBE DIVISION

CALUMET & HECLA CONSOLIDATED COPPER COMPANY

MANUFACTURERS OF SEAMLESS COPPER & BRASS TUBING

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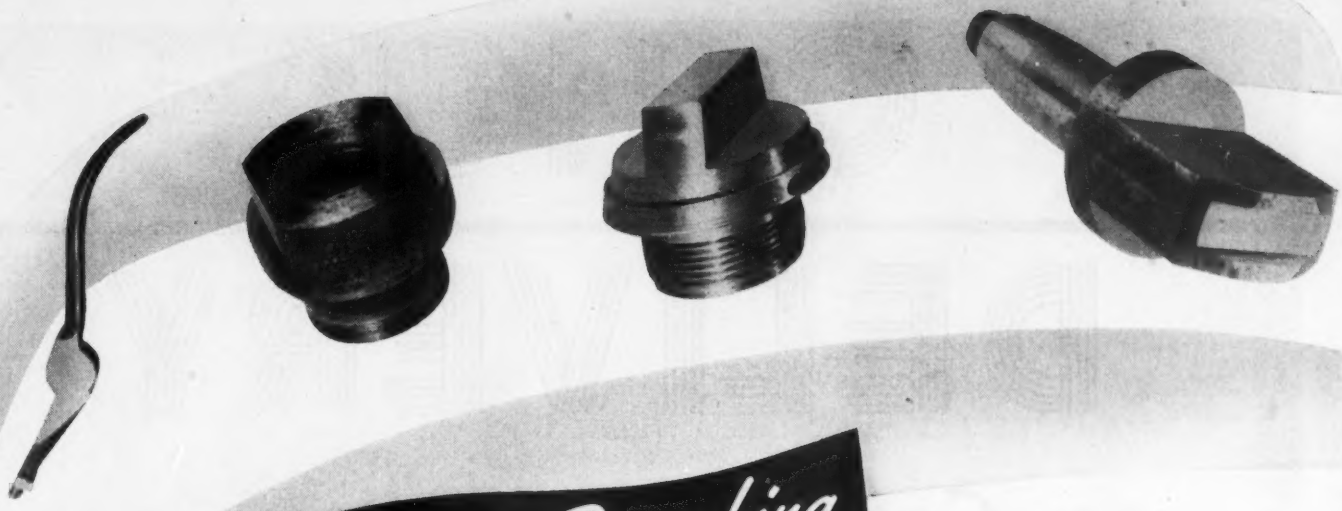
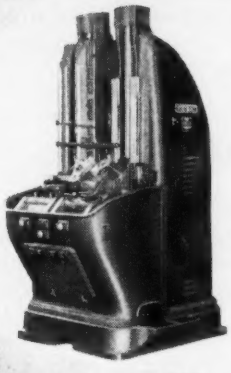
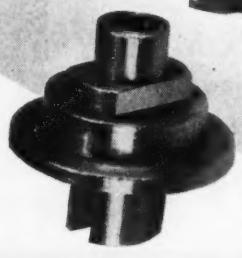


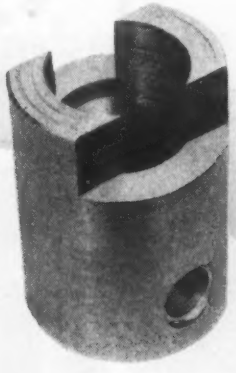
straddle *Surface Broaching* of small metal parts . . .

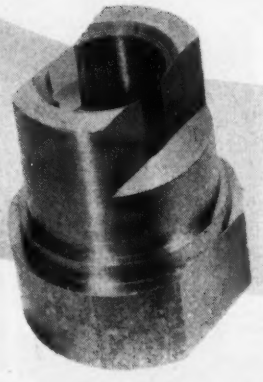


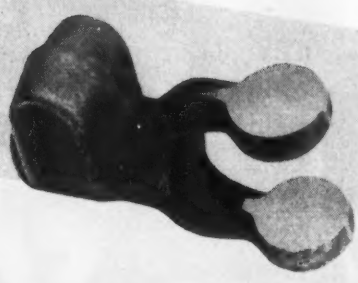
★ Wherever metal is removed on duplicate small parts you are apt to find a place where Footburt Surface Broaching Machines can cut Manufacturing costs. Production is high, parts can be machined to very close tolerances and tool maintenance is low in cost per piece. We have had many years of experience in designing the tooling for various types of parts and will gladly advise you in applying surface broaching to your work.

THE FOOTE-BURT COMPANY
CLEVELAND 8, OHIO
Detroit Office: General Motors Building









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Oxygen speeds open hearth combustion

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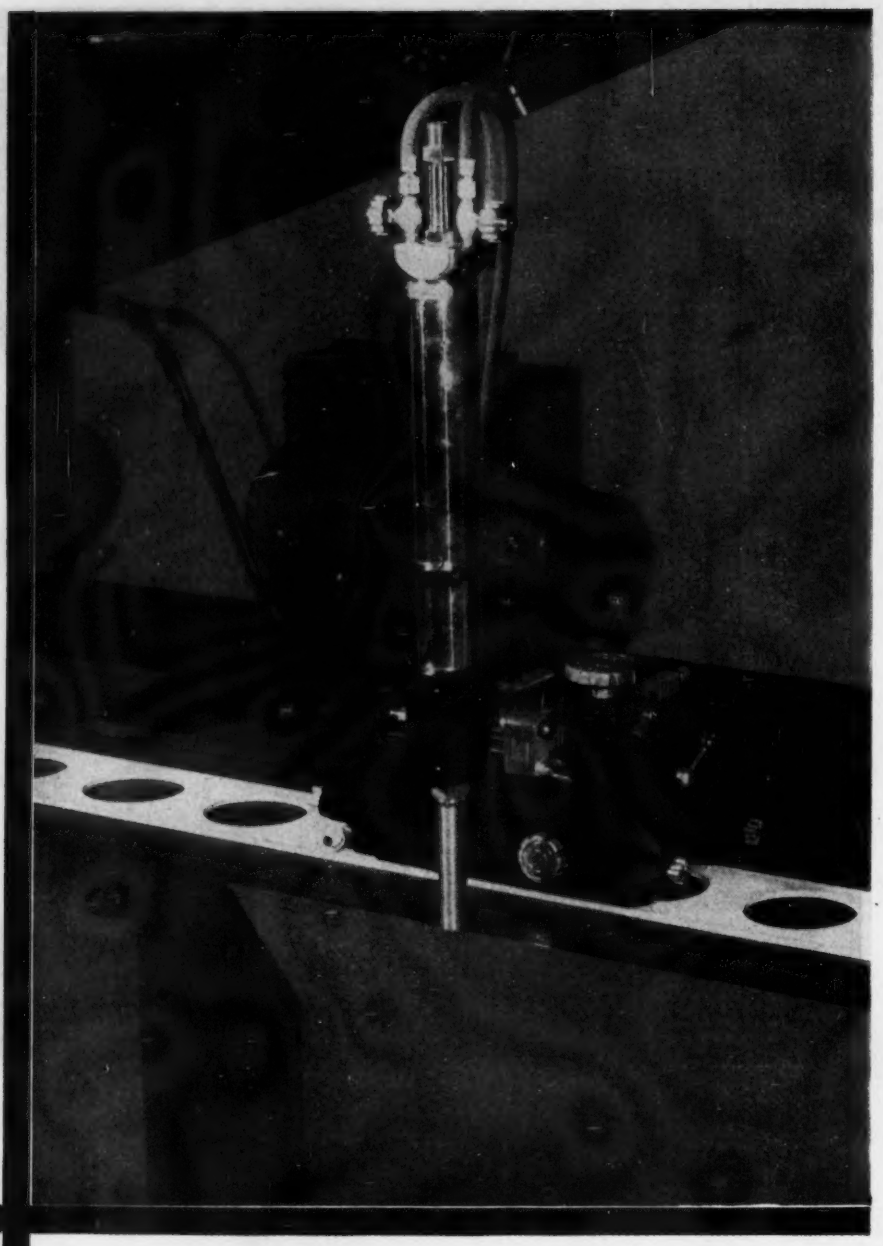

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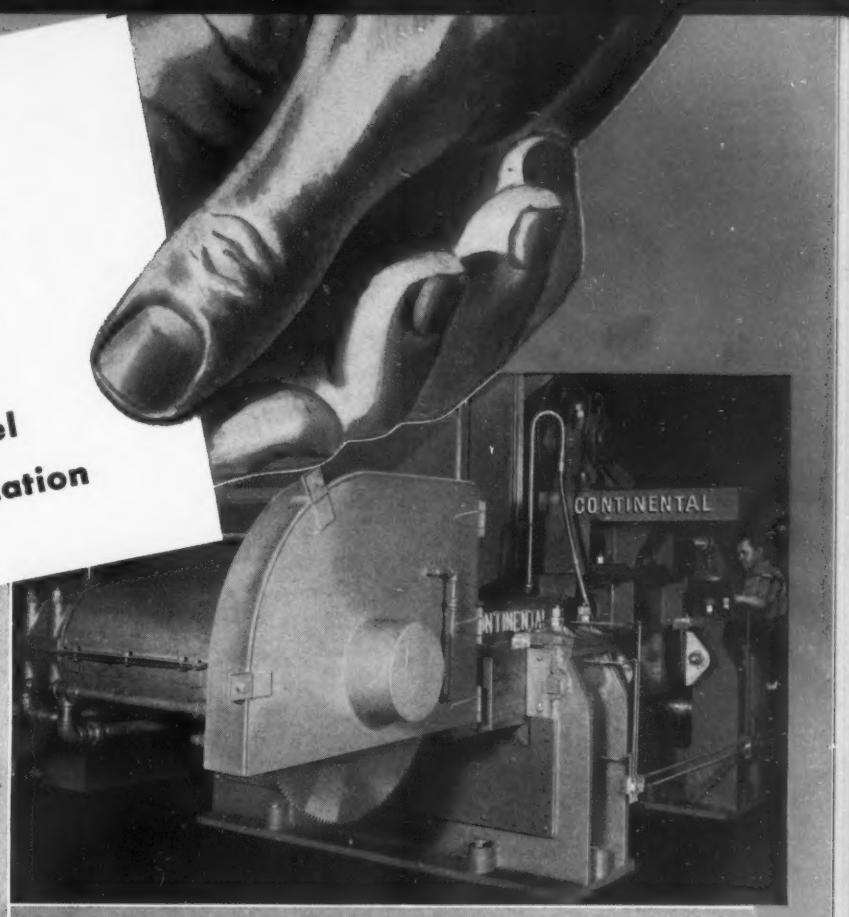

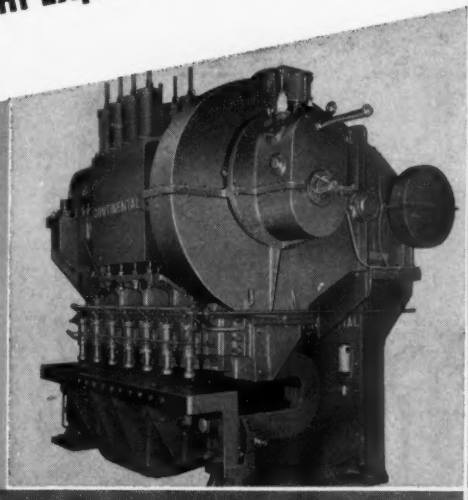

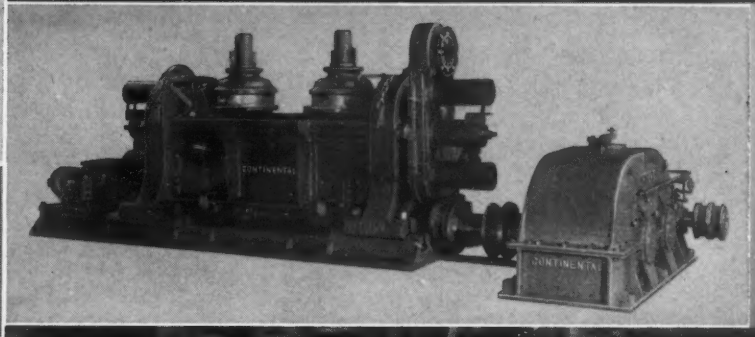

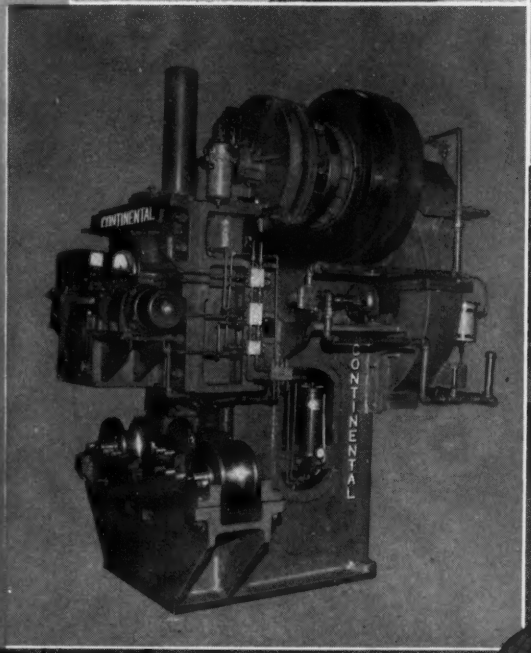

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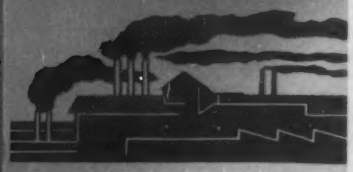

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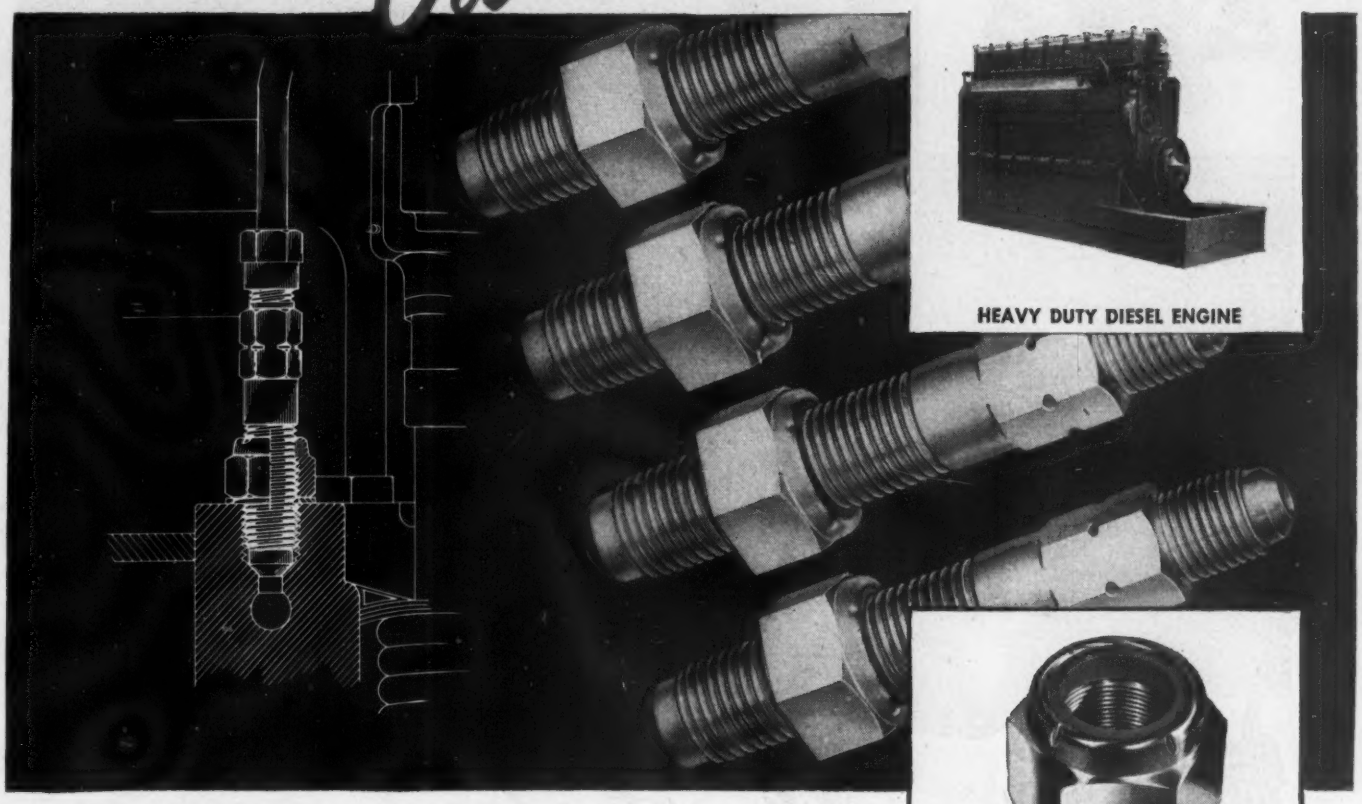
CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PENNA.

SELF-SEALING *Prevents Oil Seepage* ALONG FUEL LINE STUDS



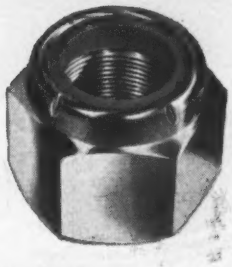
HEAVY DUTY DIESEL ENGINE

The Red Elastic Collar seals the threads tight against LIQUID SEEPAGE

Three important benefits result from the use of ESNA Elastic Stop Nuts on Diesel engine fuel line studs. *First,* operational safety. The Red Elastic Collar is self-sealing against fuel oil operating pressures up to 60 psi. *Second,* design simplification. The Red Elastic Collar is self-locking anywhere on the stud. It permits the use of straight threads—instead of individually gauged tapered threads—for the oil supply block connection. *Third,* faster assembly. Straight threads permit the accurate positioning of the studs between the block and fuel line—before the finished surface of the Elastic Stop Nut is fully seated and self-locked and self-sealed against the copper washer. The total result? Threefold economy!

Multiple protection — against Liquid Seepage, Vibration, Corrosion, Thread Failure and Costly Maintenance — has made Elastic Stop Nuts the standard fastener on many products. Standardization achieves the double economy of inventory simplification and reduced procurement costs. For further information address: Elastic Stop Nut Corporation of America, Union, New Jersey. Sales Engineers and Distributors are located in principal cities.

ESNA
TRADE MARK



LOOK FOR THE RED COLLAR THE SYMBOL OF SECURITY

It is threadless and permanently elastic. Every bolt — *regardless of commercial tolerances* — impresses (does not cut) its full thread contact in the Red Elastic Collar. This threading action produces a compressive, radial-reactive pressure against *both* the top and bottom sides of the bolt threads . . . insures a permanently tight, full contact between the bolt and nut threads . . . and makes all Elastic Stop Nuts self-sealing against Liquid Seepage.

As a result, all Elastic Stop Nuts protect permanently against thread corrosion and resultant failure.

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PRODUCTS OF: ELASTIC STOP NUT CORPORATION OF AMERICA

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ARE USED BY YALE & TOWNE IN

ITS NEW DUAL SHOE PLATE AUTOMATIC IRON

Big news in appliance and consumer circles is the Yale & Towne Manufacturing Company's new TIP TOE iron . . . latest venture of this maker long known for quality locking devices and materials handling equipment.

In making this quality appliance of high eye-appeal, Presteel has an important role. The hoods and cooling decks illustrated are made by Presteel with extreme accuracy to assure proper fit and assembly with other parts. Both hoods and decks are made from cold rolled bright finish steel produced in Presteel's own rolling mill. Because an excellent finish must be maintained with no wrinkles or waves throughout the press operations which follow, the highest degree of production control is required.

In solving problems of this kind, look to Presteel's experience, craftsmanship in tool making and complete production facilities.

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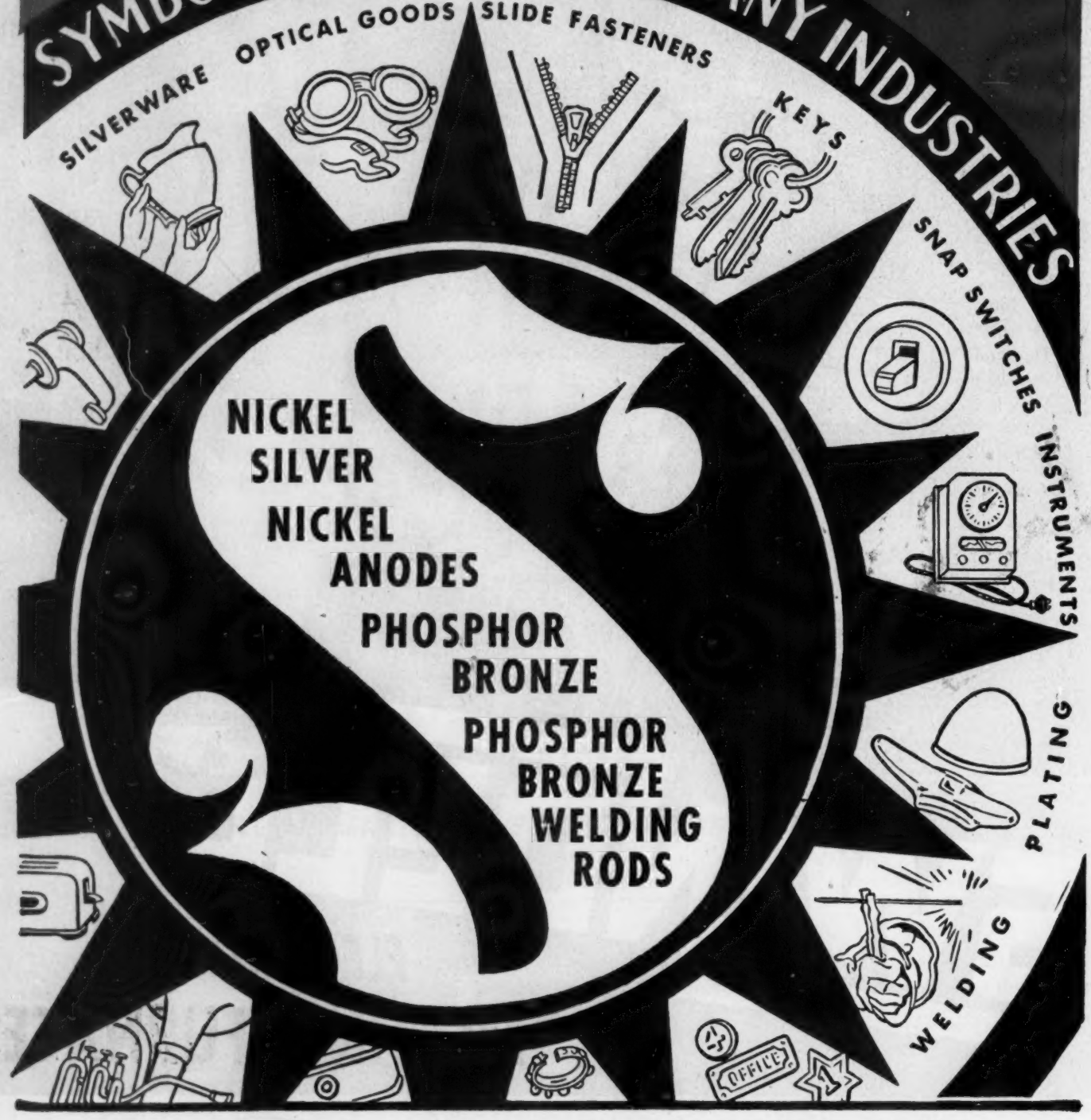

THE SEYMOUR MANUFACTURING COMPANY, SEYMOUR, CONN., U.S.A.

SEYMOUR

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE

35 Years Ago

THIS FOUNDRY FOUND THE ANSWER

How to maintain production while keeping grinding costs down? Today that's a big worry—but even back in 1912 a well-known malleable iron foundry was faced with the same problem, and the management found the answer because they knew where to look for it.

They knew that wheels made by "U.S." were originated in 1863.

They knew that "U. S." had research facilities which not only thoroughly covered abrasives and bonds, but also extended into all the fields covered by the many products of United States Rubber Company.

And they knew that "U. S." would come up with the type of wheel that would meet requirements.

This foundry picked U. S. Wheels and has been using them ever since.

Whether you're snagging castings or grinding ball races, there's a U. S. Royalite Wheel engineered precisely to the job—carefully tested in both factory and laboratory.

For your own particular needs, you can obtain *in advance* accurate grinding costs with U. S. Royalite Wheels from one of our trained field engineers, who will make thorough tests right in your own plant.

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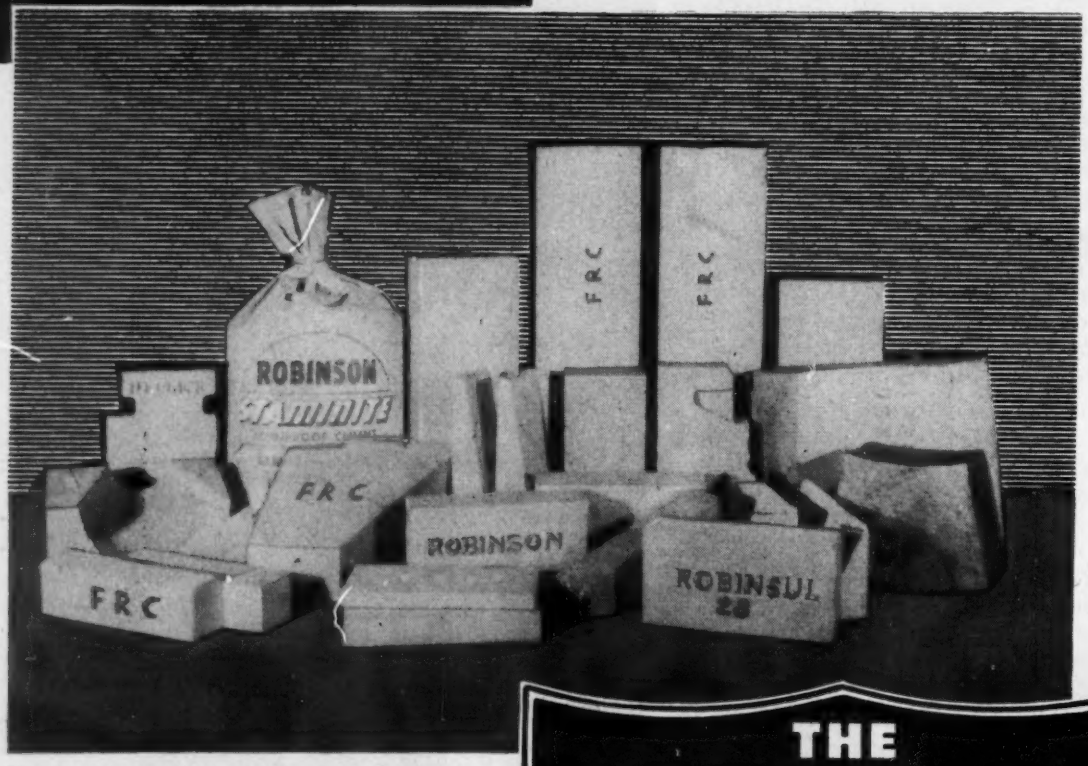

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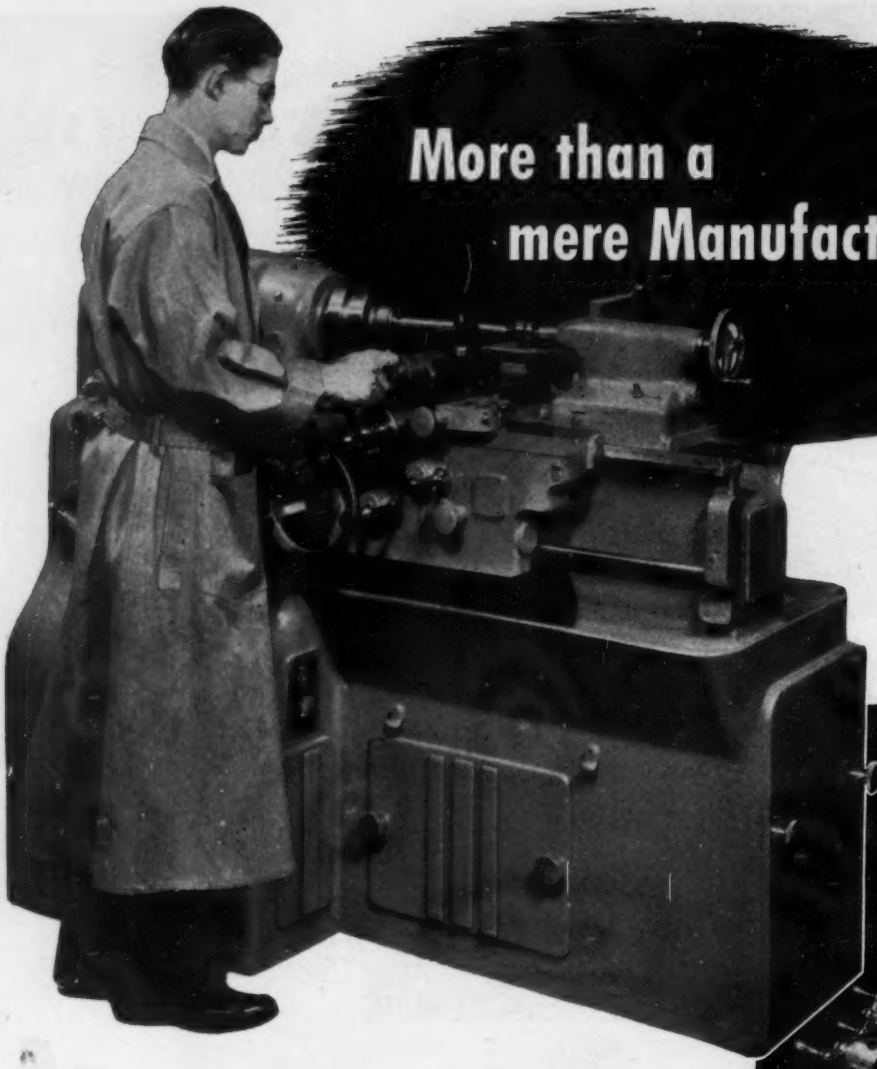

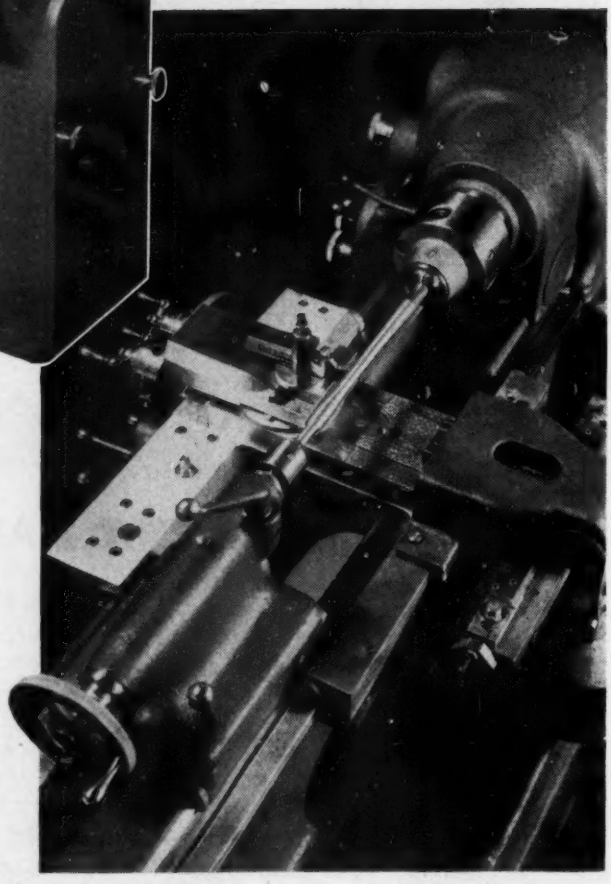

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Business Staff on Page 4

NEXT WEEK . . .

Transforming Pigs to Pipe

Nonmagnetic Arc Welded Joints

Maintaining Press-Fit Tolerances

Engineers Evaluate Oxygen

STEEL

The Magazine of Metalworking and Metalproducing

Vol. 121, NO. 14 OCTOBER 6, 1947

NEWS

★ As the Editor Views the News 65
Export Drain on Scarce Steel Supplies To Ease 69
★ Present, Past and Pending 71
Warehouses To Be Little Affected by Reduced Mill Allocations 72
Steel Supply Not To Blame for Car Shortages, Tower Says 73
Automotive Industry Continues To Be Biggest Steel Consumer 74
Reorganization of Germany Held Vital to Welfare of U. S. 75
Declining Trend in Tool Orders Seen Reversed 76
Steel Institute Begins Technical Meeting Series 77
★ Windows of Washington 78
Joint Army-Navy Specifications Are Approved 81
Britain Pushing for Greater Exports of Manufactured Goods 82
Belgo-Luxemburg Union's Trade Agreements Spur Exports 82
Russia Seeks Dominant Role in European, Asiatic Steelmaking 83
★ Mirrors of Motordom 85
Plans $5 Million Expansion for Chicago Works 88
★ Briefs 89
★ The Business Trend 90
★ Men of Industry 92
★ Obituaries 97
★ Construction and Enterprise 232

TECHNICAL

Effect of Heat Treating and Cold Rolling on Crystal Structure of Austenitic Manganese Steel 98
★ Seen and Heard in the Machinery Field 101
Preview of 29th National Metal Congress and Exposition 102
Exhibitors 104
Floor Plan—International Amphitheatre 104
Programs and Papers To Be Presented 106
Seminar: Fundamental Relations in Fracturing Metals 106
American Society for Metals 106
American Welding Society 107
American Institute of Mining & Metallurgical Engineers 109
American Industrial Radium & X-Ray Society 110
Technical Papers Summarized 110
★ Progress in Steelmaking—New Coal Field: Low Temperature Coke 124
Effective Use of Rubber Forming Dies 126
Cylinder Parts Constructed of Solid Steel Blocks 129
Success in Steel Treating Depends on Experience, Common Sense 178
Abrasion Resistance of White Cast Iron Improved by Alloying 184
★ Engineering News at a Glance 206
★ New Products and Equipment 211
★ Helpful Literature 215

MARKETS

Steelmakers Trim Fourth Quarter Consumer Quotas 217
★ Market Prices and Composites 218
Development of New Metal Deposits Urged 222

★*Index to Advertisers* 248

★—Denotes regular features.

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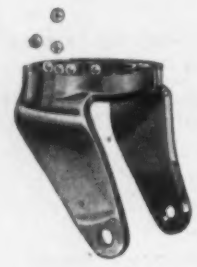

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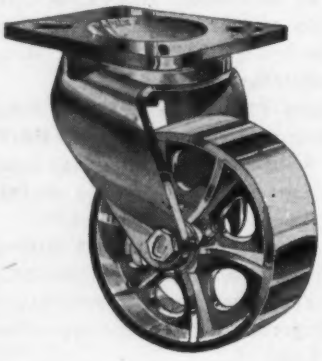

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October 6, 1947

$600 Billion!

It is a shame that the average American citizen is so poorly prepared for the inflation, scarcities and other trying conditions which confront him today.

All through the war he listened to confusing predictions by government and other spokesmen as to what to expect after the war ended. Some exalted personages led him to expect a Utopia; others warned him of a severe depression with millions unemployed a half-year after V-J Day. Nobody in public office stressed strongly enough the fact that a war of the magnitude of World War II is destructive beyond calculation and that inflation and shortages inevitably must follow such a violent upheaval of our economy.

People in the war-devastated areas of Europe and Asia can understand inflation and shortages more easily than we can, because they can see the wreckage of war and the destruction of production facilities. Here we see no signs of destruction and we wonder why we are having so much trouble.

Too many of our people do not realize that our losses due to war are not visible. Charles F. Kettering made this point effectively in his address at the Machine Tool Congress a few weeks ago. He said that some people think "we were lucky in this last war. All of our cities and buildings are intact. But when you take the $600 billion that we spent, that will replace, according to the tax value, every important city in the United States. In fact, $600 billion is more than the total appraised value of all the property in the United States. And they say we didn't lose anything!

"You can't spend $600 billion and not weaken something some place. So now we are having inflation and things are scarce. We are trying to build as we did before the war, but with this deficit under us. It takes time, but we will get production back without tearing the world to pieces and putting it back together again."

A better realization by all of us as to what the war did to our economy would help us to better understand why the road to recovery is so tortuous and why productivity—more and harder work—is about the only remedy.

* * *

MORE STEEL IN 1947: Release by American Iron & Steel Institute of figures on the distribution of finished steel in June provides totals for the first half which can be compared with prewar totals.

Shipments during the first six months of 1947 totaled 31,148,596 tons. On the basis of this figure, it is reasonable to expect that shipments for the entire year will be about 62,000,000 tons, barring unforeseen contingencies. This would be a new peacetime record.

By doubling the tonnages shipped to consuming industries during the first half, one gets a fair idea of the amount of steel that will be available for the entire year. If shipments to the automobile industry in 1947 are double the tonnage shipped in the first half, motordom by Dec. 31 will have received 8,717,252 net tons. This compares with 7,185,016 tons received in the full prewar year of 1940. Rail transportation will have received 4,940,964 tons in 1947, compared with 3,777,377 tons in prewar 1940. Jobbers, dealers and distributors will have received 10,471,108 tons as against 6,032,598 in

(OVER)

AS THE EDITOR VIEWS THE NEWS

1940. Total steel shipped in 1947 will be about a third more than was shipped in 1946.

There isn't enough steel to go around; nevertheless, these comparisons are illuminating.

—p. 74

* * *

FORD FRATERNIZATION: For many years spokesmen for Ford Motor Co. were noticeably reticent about company affairs. Ford executives seldom addressed or participated in meetings attended by representatives of other motor car manufacturers. In many respects, Ford Motor was a lone wolf operator.

Today Ford Motor is becoming articulate. Henry Ford II, E. R. Breech, Harold Youngren, L. D. Crusoe, John S. Bugas and other top-flight executives are appearing frequently at industry meetings and they are discussing Ford policies frankly. They have made more addresses and mixed more freely with contemporaries in a few months than did their predecessors in an entire decade.

Suppliers and competitors of Ford are watching this unusual metamorphosis with hopeful anticipation. There are numerous broad industry problems in which the weight of Ford co-operation—in contrast to the traditional Ford aloofness—could be decisive. The fraternization of high Ford personnel is an historic event in motordom.

—p. 85

* * *

29TH METAL CONGRESS: A portion of this issue is devoted to a preview of the 29th National Metal Congress and Exposition to be held in Chicago, Oct. 18-24. This well established event, sponsored by the American Society for Metals, embraces not only the show—in which 300 manufacturers will exhibit equipment, products and methods—but also extensive technical sessions of ASM, American Welding Society, Iron and Steel and Institute of Metals Divisions of the American Institute of Mining & Metallurgical Engineers, and the American Industrial Radium & X-Ray Society.

A new feature of the congress will be a seminar of six panel discussion meetings on "Fundamental Relations in the Fracture of Metals," presented by ASM in co-operation with Case Institute of Technology. A meeting on "Metallurgical Requirements of the Atomic Energy and Power Reduction Program" is another highlight in a fully-scheduled week of discussion on current progress in the technology of metals.

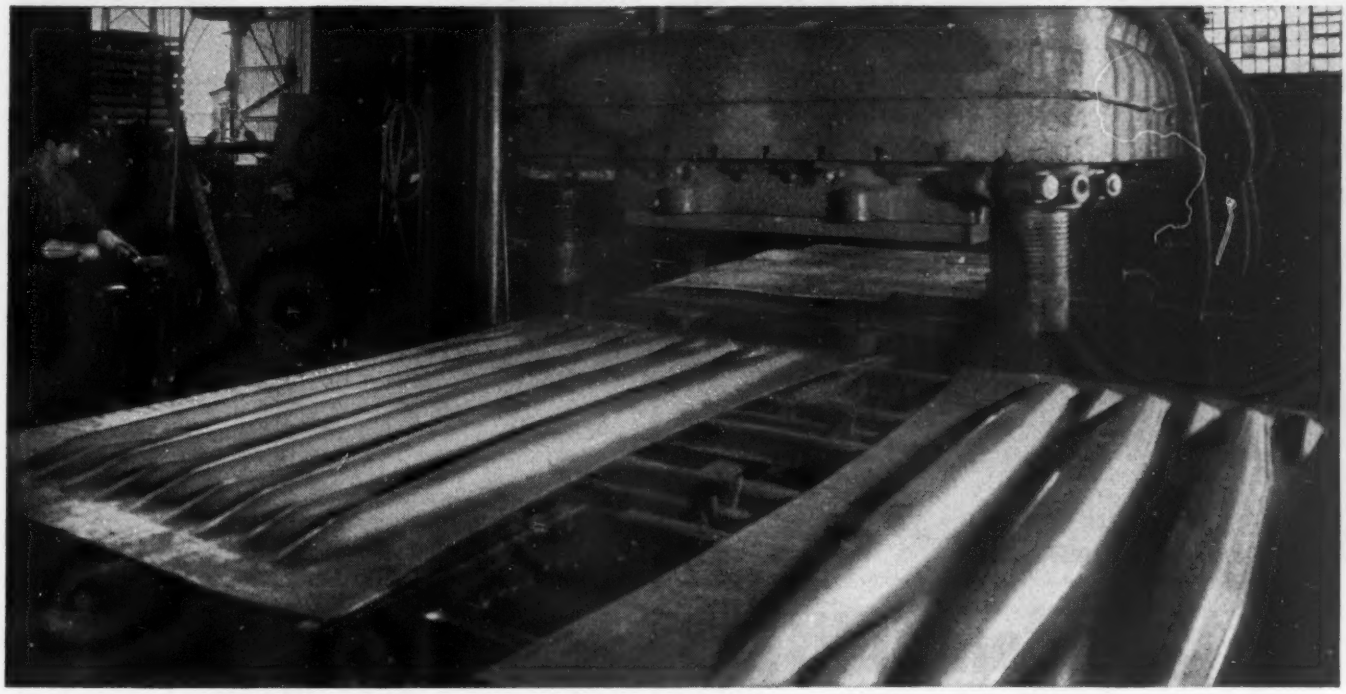
—pp. 102, 104, 106

SIGNS OF THE TIMES: Kaiser-Frazer employees at Willow Run cheered as the 100,000th car rolled off the line. Company officials acclaim the production of 100,000 units in 15 months after starting from scratch (p. 86) as a feat unequaled in motordom. K-F assemblies now are running at 700 daily. The employees' bonus pool, now mounting at the rate of $5 per car, already exceeds $470,000. . . . A study by the Department of Commerce indicates that according to Russia's reckoning, another 15 years of forced-draft expansion will be required (p. 83) before Soviet steel production will be sufficient to meet its domestic needs. . . . This publication's index of industrial production for the week ended Sept. 27 registered 166 per cent of the 1936-1939 average. This establishes a new postwar high (p. 90), exceeding the previous record of 164 per cent registered in the weeks of Mar. 22 and Sept. 20 this year. . . . American steel producers exported 2,086,260 tons of steel during the first half of 1947, or 6.7 per cent of the industry's total finished steel shipments. However, this was only four-sevenths of the steel exported from this country during the period. The other three-sevenths (p. 70) came from government surplus, warehouses and other private sources. . . . At a symposium on the business outlook sponsored by the National Industrial Conference Board (p. 75) Lewis H. Brown, chairman, Johns-Manville Corp., said no problem is more important to the United States than reorganization of the German economy; Paul Mazur, Lehman Bros., asserted that despite some maladjustments the American economy as a whole seems fairly in balance; and Charles O. Hardy cited five factors contributing to the present boom and concluded that none of these factors has spent its force nor is any factor working against them. . . . Joseph L. Trecker, president of Kearney & Trecker Corp. predicts (p. 76) that sales of machine tools will step up to $500 million annually in the next 12 months. This contrasts with estimated sales of $300 million for 1947. . . . Cyrus S. Ching, director of the new Federal Mediation & Conciliation Service, states to an editor of this publication (p. 78) that his agency will encourage labor and management to settle disputes without government intervention. The agency will step in only when necessary to protect the public interest.

E. L. Shaner

EDITOR-IN-CHIEF

How to make . . .
THREE tons of steel do the work of FOUR



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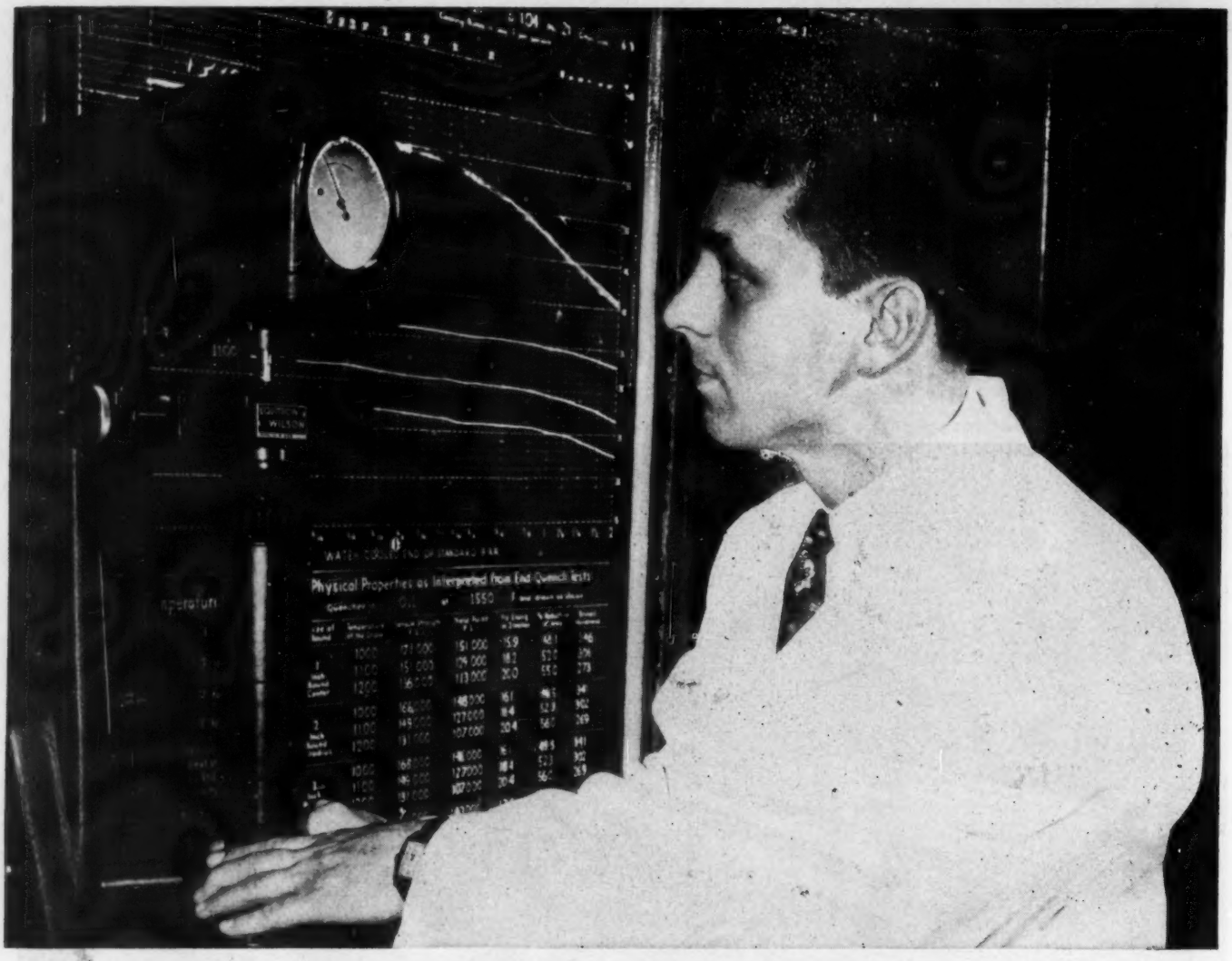

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Export Drain on Scarce Steel Supplies To Ease

Change in licensing procedure, postponement of setting fourth quarter quotas and shortage of dollar exchange combine to cause slackening in foreign shipments. European aid program expected to require only moderate tonnage

STEEL
October
6
1947

Steel girders from an American mill are unloaded at a foreign port for use in reconstruction. American manufacturers are concerned over the drain steel exports under the Marshall Plan may have on the domestic supply. U. S. Steel photo

DESPITE worries by metalworking companies that large-scale relief for Europe will drain more hard-to-spare steel from this country's industry, the outlook is for a downward trend in steel exports over the remainder of 1947.

Exporters report the decline in steel shipments set in early in the third quarter, following an active first half with foreign shipments from all sources totaling 3,125,642 long tons, compared with 4,580,946 during all of 1946. The decline to date is attributed to dollar shortages abroad and to shifting in the method of export licensing from consolidated to individual licensing.

A further drag in exports will result from postponement in the establishing of fourth quarter quotas until November, which means little tonnage can be shipped this year against fourth quarter quotas. Certain emergency tonnages may be shipped ahead of the announcement of fourth quarter quotas and applied to them later and possibly some steel will be shipped after the announcement of quotas, but the total is expected to be negligible.

Change in export licensing became effective Oct. 1 and represents a return to near wartime control of steel exports. It will affect about 50 major iron and steel products. Tin plate long has been on an individual licensing basis, and plates were returned to a licensing basis late last spring in an effort to exert a more rigid control over this commodity.

On the eve of the effective date of the new licensing procedure, the Office of International Trade announced an intensive drive to assure compliance. Instructions have been issued to OIT compliance and legal staffs to expedite investigations of all alleged violations, with particular emphasis on the practice of trafficking in licenses. Additional employees have been added to make the drive more effective.

The new licensing regulation permits exporters to use export licenses only to carry out shipments against orders which they received prior to issuance of the licenses. They are required to apply for new licenses to cover orders received subsequently. OIT has warned exporters against soliciting orders by indicating they already hold an approved license for export. They have also warned against attempted purchases of licenses required for exports.

Violations of export control regulations, OIT points out, are punishable not only by fine and imprisonment, but also by administrative denial of the privilege of applying for licenses. This latter type of penalty was invoked on numerous occasions during the war and is particularly effective because it can be applied fairly speedily, upon the basis solely of administrative notice and a hearing before a compliance commissioner, upon whose recommendation action is taken by the director of the export supply branch.

However, a fairly substantial tonnage of export steel remains to be moved under the old consolidated licenses. Most producers are behind on their shipments and have until the end of February when the Export Control Act expires to finish shipments under the consolidated licenses.

Setting up of the individual licenses

Surplus machine tools destined for Norway are loaded into the hold of the Swedish freighter S. S. Erland at Cleveland. Numerous inquiries and orders have been received from Scandinavia. WAA photo

is proving to be a difficult job, for the reason that the end uses of the steel to be shipped must be ascertained. These are reported by the importing country and are checked by the American government through its officials abroad.

Incidentally, only about four-sevenths of the steel exported during the first half was shipped by producing companies, the remainder coming from government surplus, sales from warehouses and other private sources.

Shipments by producers, as reported by the American Iron & Steel Institute, amounted to 2,086,260 net tons during the first half, or 6.7 per cent of the industry's total finished steel shipments.

Sen. Kenneth Wherry (Rep., Nebr.), chairman of the Senate Small Business Committee, last week objected to the practice of the Department of Commerce of granting ex-quota licenses for export and charged that this practice "has played havoc with steel supplies in the past 18 months."

Senator Wherry wrote to Secretary of Commerce Harriman to ask about reports the department was about "to grant an export license for 40,000 tons of steel pipe to be shipped to Saudi Arabia as a part of steel shipments alleged to be 500,000 tons over three years."

"If these rumors are true," said Senator Wherry, "I would appreciate your letting the committee know how such a large shipment of steel can be justified in the present shortage of steel." Senator Wherry said he believes the granting of ex-quota licenses is defeating the intent of Congress in passing the Export Control Act, and has made it impossible for the American consumer to plan his production on a sound basis.

The proposed Marshall Plan is expected to have relatively little bearing on fourth quarter quotas, as it is doubtful that program will be sufficiently clarified by the time the quotas are announced. As a matter of fact, if and once the plan does become operative it is doubtful it will create much added pressure for shipment of steel abroad—that is, not any more at least than has long been contemplated even before the Marshall Plan was announced.

The iron and steel committee, representing the 16 foreign nations at the Paris economic conference, recently announced that the participating nations would be self-sufficient in steel production, except in sheet and tin plate, by the end of 1948 and that by 1951, through close co-operation among the nations, they would become self-supporting on all products. The major difficulty at present is the shortage of coke and coal, it was pointed out.

This iron and steel committee believes that the finished steel output in Great Britain and western Europe would amount to 43,900,000 metric tons by 1951, against 34,100,000 in 1938; 23,700,000 in 1947, and 34 million in 1948.

Scrap Conservation Plan Opposed

The proposal in some quarters in Washington to the effect that instead of shipping finished steel products to Europe the steel should be shipped in final fabricated form so as to conserve scrap, has met with some opposition in steel export circles for the reason that it would add greatly to the existing scarcity of dollars abroad, to say nothing of withholding fabricating operations badly needed on the other side to provide employment.

While the new individual licensing system should not over the long run restrict the volume of exports, it will undoubtedly result in the re-channeling of considerable tonnage, with some countries benefiting at the expense of others. This means, especially with the Marshall Plan coming up, that the western European faction will be receiving more tonnage than heretofore and at the likely expense of South American countries and other sections more remote from the impact of the recent war.

Of course, many countries who cannot look for important financial aid from the United States are already feeling the effects of the dollar shortage and are not in position to finance purchases at the rate they have over the past several years.

South American countries, for instance, are still interested in substantial tonnages of all the common steel products, and especially reinforcing

bars for road and other types of construction. However, their inquiries are not as heavy as last year, due to exchange difficulties.

This applies to various other sections of the world, although all are interested in steel of one description or another. South Africa, which now has a steel industry which furnishes no little tonnage of iron, is in need of wire and tin plate. Most tonnage now moving into the Far East from the United States is for the Philippines, New Zealand and Australia. The products are varied, especially for the Philippines; in the case of Australia the steel is largely tin plate. Little is going to China and little or nothing so far to Japan. Tonnage moving into southern Europe is light, involving principally pipe and tin plate. The Scandinavian countries are pressing principally for plates as well as some of the other common steel products, and all along have been granted a fairly liberal allotment of tin plate. France's requirements include, interestingly, a few items which are now in less pressing demand here —cold-drawn bars and various types of alloy steels.

Exports Take 9.7 Per Cent Of 1946 Steel Shipments

In 1946 exports of finished and semifinished steel amounted to 4,747,397 net tons, or 9.7 per cent of shipments to all consumers, domestic and foreign, according to an analysis of Department of Commerce data by the American Iron & Steel Institute. The total tonnage was the lowest since 1940 but twice the prewar average. Total exports of steel and iron products, including pig iron, ferroalloys, and some fabricated steel products, came to 5,030,656 tons in 1946, which was the lowest tonnage since 1940.

During 1946, the first full peacetime year since 1939, a number of changes occurred in export markets compared to prewar years. Shipments to Asia were equal to about half of the 1939 exports to that area, while shipments to Africa were almost double the 1939 total. Shipments to Europe were almost three times the prewar 1939 amount; exports to South America were more than double those of 1939, and the amount shipped to North and Central America was almost double the prewar total.

Canada was the largest customer in both 1939 and 1946, receiving 443,115 and 806,130 tons, respectively, in the two years. Brazil, which had been the fourth largest customer in 1939, providing a market for 167,571 net tons of iron and steel products in that year, moved up to second place in 1946 when it received 430,343 tons.

France moved up to the third largest customer in 1946, accounting for 391,618 tons of our exports, whereas in prewar 1939 that nation was one of the smallest steel customers.

Great Britain received almost 100,000 more tons of steel in 1946 than it did in 1939, with shipments to that nation for both years being 279,731 and 183,793, respectively. Sweden, which had been cut off from U. S. steel imports by the war, obtained 286,692 tons of such products from American steel producers in 1946, more than 100,000 tons above the 1939 total.

Mexico was the fourth largest taker of steel and iron from the U. S. in 1946, receiving 320,989 tons last year, as against only 99,786 in 1939. Argentina received more than a quarter of a million tons, with its 296,659 total equal to about four times the amount shipped to that country in 1939. Venezuela received 205,367 tons in 1946; Colombia was shipped 126,750 tons, and Cuba secured 120,940 tons.

Flat-rolled steel was in strong demand abroad, but the amount exported last year was little more than was shipped abroad in 1939 and was the lowest total for any year from 1940 to 1946 inclusive. However, the overall amount of black steel sheets, galvanized sheets, and hot and cold-rolled strip exported in 1946 came to 709,530 tons, as compared with 525,219 tons in 1939.

Exports of pipe, tubes and fittings in 1946 at 458,540 net tons were equivalent to 9.8 per cent of the total shipments to domestic and foreign consumers for that year, coming to 4,655,505 net tons. This would indicate that foreign shipments of these products were just about in line with the overall portion of export tonnage to total 1946 shipments.

These figures are higher than the total reported by the American Iron & Steel Institute on its form, AIS-16, largely due to the fact that the latter form reflects only direct shipments for exports by steel producers, whereas the report of the Department of Commerce also reflects exports by warehouse distributors and others.

Present, Past and Pending

■ FASTENER MANUFACTURER BUILDING NEW PLANT

MORTON GROVE, ILL.—H. M. Harper Co., manufacturer of nuts, bolts and other fasteners in the nonferrous and stainless steel alloys, is building a manufacturing plant and general offices. New buildings will cover 138,000 sq ft.

■ WESTINGHOUSE DOUBLES POWER EQUIPMENT OUTPUT

PITTSBURGH—Steam turbine generating equipment is being produced at a rate nearly double that of any previous year by Westinghouse Electric Corp., according to President Gwilym A. Price. By 1951, the country's generating capacity will be increased 40 per cent, or 20 million kilowatts.

■ CANADIAN RAILROAD CARS SOLD TO ARGENTINA

NEW YORK—Fifteen hundred Canadian-built flat cars of 50-ton capacity have been sold to Argentina. Cars were built in 1945 for Russia under Canadian lend-lease and were transferred to the Canadian War Assets Administration at the end of the war.

■ PITTSBURGH FEARS INDUSTRIAL FUEL SHORTAGE

PITTSBURGH—Serious shortage of industrial fuels may cause widespread industrial curtailments during the coming winter, unless the weather is mild, local manufacturers believe. Most critical shortage is in natural gas, although fuel oil also is scarce.

■ WASHER SALES ESTABLISH NEW RECORD

CHICAGO—Industry-wide sales of standard-size household washers again set a new all-time record in August, aggregating 323,063 units and topping the previous record of 320,969 units set in April. Sales for eight months in 1947 totaled 2,395,999, compared with 2,023,981 in all 1946.

■ 20,000 TONS STEEL ALLOCATED FOR ARABIAN PIPELINE

WASHINGTON—First steel allocation for the 1140-mile pipeline of the Trans-Arabian Pipe Line Co. from Saudi Arabia to the Mediterranean, calls for 20,000 tons to be shipped in the fourth quarter. Total steel requirements are 305,000 tons and the line is scheduled to be completed in the first quarter of 1949.

Jobbers To Feel Quota Cuts Little

Reduced mill allocations to warehouses expected to be largely offset by shipments against arrearages, but demand will far outstrip receipts

BURIED PIPE TO HEAT WAREHOUSE: Heat from these 1-in. steel pipes will radiate through 10 in. of concrete to heat the 3-acre warehouse of the National Tube Co., United States Steel Corp. subsidiary, at Lorain, O. The quarter-mile-long warehouse will contain 7 million cu ft, will store pipe in many sizes

TO GET abreast of commitments of steel to warehouses, numerous mills have reduced their monthly allocations by as much as 50 per cent in the year's final quarter. For steel consumers dependent for a large part, or all, of their requirements upon warehouses these reductions seemed to sound a death knell to aspirations of keeping operations at their current levels. But while it is true that the majority of mills have blanked out complete months, and in at least one instance the entire three months, of the fourth quarter in an attempt to get order books on a current basis, warehouses, with only a few exceptions, expect their total steel receipts to show only little worsening from the last few months.

Supply Predicated on Operations

On the assumption that mills will be able to maintain their present near-capacity rate of primary and rolling mill production, monthly steel receipts composed of steel shipped against the reduced quotas plus accumulated carryover tonnage probably will change little from the levels prevailing throughout the third quarter. Of course with winter in the offing, and in view of the already tight supply situation in scrap, pig iron, coke, industrial gas and other steelmaking materials, not to mention the ever-present possibility of labor trouble, the steelmaking rate may not be sustained, in which case smaller shipments of steel would inevitably follow. Another factor which may serve to lower temporarily the amount of steel produced is the pressing need for extensive repairs to steelmaking facilities now suffering from the terrific pace they have been subjected to over recent years.

Oversimplified, the present position in which the steel mills now find themselves is the result of accepting orders in excess of ability to produce. Mills in the Pittsburgh area, for example, went into the final quarter with carryover tonnages in plates and light structural sections of four to five weeks; other structurals, three to four weeks; small carbon bars, two to three weeks; sheets and other steel items, under two weeks. To clear up these arrearages on warehouse accounts varying cuts in mill quotas have been established at levels 10 to 50 per cent lower, dependent upon the extent of the carryover tonnage.

In Cleveland warehousemen report their steel receipts in the critical products will probably be about 50 per cent of customers' requirements. This extreme contrast between supply and demand is accountable to new customers, previously supplied directly by the mills but now unable to get on producers' books, and the pressing demands of steel users whose operations now are far above normal peacetime levels. Receipts this quarter are expected to be in about the same volume as they were in the first quarter, somewhat lower than during second and third but far better than would be indicated by the lower mill allocations. The loss of steel during the months which mills have blanked out will be made up to a large extent by shipments against arrearages, leaving warehouses generally with only small net losses in receipts.

Warehousemen in New York see a gloomy outlook for receipts of flat rolled carbon tonnage over the remainder of the year. A sharp decline in receipts in the third quarter, followed by reduced allocations in the fourth are expected to result in supplies of sheet for the last half of the year being only one-quarter of the expected tonnage.

Boston users of sheet steel are extremely hard pressed for material—warehouse-dependent consumers are unable to get enough and buyers normally buying the major part of their requirements from mills have turned to warehouses because their mill allocations at near prewar levels are far below postwar requirements. Warehouse inventories are depleted and the fourth quarter is expected to bring no relief.

Counter to the general trend, few mills in the Chicago area have reduced warehouse or other customer quotas despite the fact that shipments are far behind commitments. The majority of mills hope to let quotas stand unchanged now and plan to appraise their carryovers at the year-end, in the meantime shipping as much as they can against established allotments. For this reason warehouses and likewise consumers in that area expect to receive about the same tonnages of flat-rolled products they got in second and third quarters. Some warehouses, as a matter of fact, fared better in third quarter than they had reason to expect as a result of "bonus" flat-rolled steel shipped in excess of assigned quotas. This windfall is not expected to repeat, however, and consumers will be pressing as hard as ever for increased tonnages.

Steel Supply Not To Blame for Lag In Freight Car Building, Tower Says

American Iron & Steel Institute head asserts steel shipments for car building have exceeded quota while car production has fallen below schedule, and hints exports may be responsible for failure of domestic output to keep pace with program

STEEL MILLS are not to blame for failure of domestic railroad freight car production to reach the goal under the Office of Defense Transportation program.

That is the reply of Walter S. Tower, president, American Iron & Steel Institute, New York, to a recent complaint of S. M. Felton, president, American Railway Car Institute, New York, that the freight car building program currently calling for 10,000 units a month is failing because of inadequate steel supplies (STEEL, Sept. 29, p. 48).

Figures furnished to the ODT for the six months, March through August, 1947, show total shipments of steel for the program of building new domestic freight cars and for repairs exceeded the amount called for in the program, Mr. Tower asserts. Meanwhile, production of domestic railroad freight cars failed to equal the goal established by the ODT, he points out.

"The program called for delivery of 7000 new domestic cars per month, starting in June. Later it was stepped up to 10,000 cars per month, starting in September," Mr. Tower explains.

"Under the program established last February, steel companies agreed to supply builders of freight cars, including railroad car shops, with 163,000 tons a month during April, May and June. Sixty thousand tons per month of that tonnage was scheduled to be used for maintenance and repair work, and the balance, consisting of bars, structural shapes, plates, sheet and strip, pipe, axles and billets, was scheduled to be used for domestic car production only. Delivery of steel at that rate," Mr. Tower says, "was expected to result in delivery of completed domestic freight cars at the rate of 7000 cars per month commencing in June."

Data supplied by the ODT show that for that program the steel companies supplied 195,257 tons of steel in March, 199,468 in April, 198,051 in May, and 190,193 in June, Mr. Tower says. "Thus, steel shipments exceeded the program during this period by approximately 131,000 tons," Mr. Tower declares.

However, production of new freight cars for domestic buyers was 5527 in June, 5879 in July and 5963 in August, a total of only 17,369 cars against the goal of 21,000 for those months, Mr. Tower points out.

At the beginning of July, the program was stepped up, Mr. Tower explains, to provide shipments of 205,700 tons of steel per month, including 60,000 tons for maintenance and repairs. This, he asserts, should have resulted in delivery of 10,000 new domestic cars per month starting in September. "Shipments of steel in July fell below the program as a result of idleness of the coal mines in the early part of the month. The July total was only 169,000 tons. Preliminary reports for August indicate that steel shipments to carbuilders, railroad shops and component parts makers equaled the quota, if they did not exceed it, for returns from 17 of 30 companies show the 17 companies shipped 195,000 tons of steel in August," Mr. Tower reports.

Against the anticipated production of 14,000 domestic cars in July and August combined, preliminary reports, according to Mr. Tower, indicate that 11,842 domestic cars were shipped in those months, and the current information about September performance indicates that production of domestic cars has again fallen below the program.

Figures on production of domestic cars show that railroad car shops came closer to accomplishing their share of the construction program than did independent carbuilders, Mr. Tower adds.

"The program," he explains, "was established to alleviate the shortage of domestic freight cars, with the understanding that the steel required would be specified by carbuilders, component parts manufacturers and railroads only for the new domestic car and car repair programs. However, more than 16,000 foreign cars were shipped in March, April, May and June," he declares.

Special Alloys Made By Continuous Casting Process

A new process for manufacturing specialized alloy steels has been announced by the M. W. Kellogg Co., chemical engineers of Jersey City and New York. H. R. Austin, company president, describes the process as an important metallurgical development which will provide a new source of superior metals for industry.

Technically, the metallurgical process is an electric ingot method for continuous metal casting. An ingot of any desired analysis can be produced by progressive solidification, a method long recognized but not heretofore successfully attained commercially.

The alloy, it is claimed, is substantially free of the defects observed in ingots produced by the usual methods of alloy manufacture.

Applications of the new process mentioned are turbine wheels for turbo-jet aircraft engines and many other high temperature applications, high-speed tool steels, and stainless steel alloys of all types, especially where free machining is required.

Chicago 1947 Expansion Totals $142 Million

Industrial expansion and improvement programs in the Chicago area during September aggregated $17,278,000, bringing the total for the first nine months of 1947 to $142,396,000. According to the Chicago Association of Commerce and Industry, the September figure was below the $29,060,000 reported for September, 1946, the peak month for that year, but the nine months' figure was only slightly under the $143,951,000 total for the corresponding period last year.

Purchasing Agents Give Schedule for Meetings

National Association of Purchasing Agents, New York, announces its midyear public utility group meeting will be held next Mar. 8 and 9 at the Roosevelt Hotel, New Orleans. Chairman of the meeting will be Charles F. Wilson. The association's thirty-third international convention and show will be held in New York, May 31, June 1-2, 1948.

The association also announces the following conference schedule:

District No. 1, Oct. 31-Nov. 1, Salt Lake City, Utah, Hotel Utah; No. 2, Oct. 2-3, Tulsa, Okla., Hotel Tulsa; No. 6, Oct. 3-4, Cleveland, Hotel Cleveland; No. 3, Oct. 14-15, Milwaukee, Milwaukee Auditorium; No. 5, Oct. 17-18, Toronto, Ont., Canada, Royal York Hotel; No. 7, Oct. 16-17, Louisville, Ky., Kentucky Hotel; No. 9, Nov. 5-6, Springfield, Mass., Hotel Kimball.

Automotive Industry Continues To Be Biggest Consumer of Steel

Construction and maintenance group retains second place in June while container industry rises to third place and rail transportation drops to fourth. June movement of 5,263,711 tons brings total for first half of 1947 to 31,148,596 tons

WHILE the automotive industry, the nation's biggest consumer of steel, received less tonnage in June than in May its percentage of total shipments was unchanged, figures compiled by the American Iron & Steel Institute show. Of the total shipments of 5,263,711 net tons in June, the automotive industry, exclusive of tractors, received 744,541 tons, or 14.1 per cent. In May it received 769,177 tons out of the total of 5,442,343 net tons of all finished steel products shipped.

In second place in receipts of steel in June was the construction and maintenance classification, which received 543,995 net tons, or 10.3 per cent of all finished steel shipped that month. That represented an increase over May, when construction and maintenance received 539,988 net tons, or 9.9 per cent of the total shipments.

The rail transportation classification, which ranked third in May, dropped to fourth place with receipt of 411,835 tons, while the container industry, in fourth place in May, rose to third place by receiving 426,606 tons.

Tonnage shipped to jobbers, dealers and distributors declined to 863,913 net tons or 16.4 per cent of total shipments in June, compared with 999,852 tons or 16.7 per cent during May.

To converters and processors went the greatest total shipments, 908,859 tons in June, but as they shipped 479,463 tons to members of the industry for conversion into further finished products or for resale their net total receipts were 429,396 tons. In May, they received 973,847 net tons and shipped on for further conversion 495,714.

Also down were exports, which in June totaled 324,574 tons, compared with 335,322 tons in May.

Compilation of shipments of finished steel products in the first six months of 1947 shows that total movement was 31,148,596 net tons. Consuming industry receiving greatest portion of this was the automotive classification, whose receipts were 4,358,626 net tons, or 13.9 per cent. In second place is construction and maintenance with 3,035,337 tons; in third place, rail transportation with 2,470,482 tons; and in fourth place, the container industry with 2,459,085 tons. Jobbers, dealers and distributors received 16.8 per cent, or 5,235,554 tons.

Steel Distribution First Half, 1947

(Leading products of all grades, including alloy and stainless)

Market Classification	Net Total (All Products) in net tons
Converting and Processing	2,694,580
Jobbers, Dealers, Distributors	5,235,554
Construction, Maintenance	3,035,337
Contractors' Products	1,128,253
Automotive, excl. Tractors	4,358,626
Rail Transportation	2,470,482
Shipbuilding	163,701
Aircraft	14,818
Oil, Gas Drilling	439,463
Mining, Quarrying, Lumbering	139,465
Agricultural	610,621
Machinery, Industrial Equip., Tools	1,637,010
Elect. Mach., Equip.	798,773
Appliances, Utensils, Cutlery	774,661
Other Domestic, Commercial Equipment	845,452
Containers	2,459,085
Ordnance, Other Military	15,130
Unclassified	2,241,325
Export	2,086,260
Total	31,148,596

Hamilton Foundry Schedules Open House, Oct. 11 and 12

Hamilton Foundry & Machine Co., Hamilton, O., producer of light and medium castings, is holding an open house at its plant Oct. 11 and 12.

The firm plans to demonstrate its foundry in operation at this time. There will be actual work in progress each day, including laboratory testing, molding, coremaking, melting metal, pouring and other foundry operations.

Distribution of Steel Products—June, 1947

(In net tons of leading products of all grades of steel, including alloy and stainless)

Market Classification	Shapes	Plates	Hot Rolled Bars	Cold Finished Bars	Seamless Tubing	Drawn Wire	Hot Rolled Sheets	Cold Rolled Sheets	Coated Sheets	Hot Rolled Strip	Cold Rolled Strip	Total (all products)
Converting and Processing	3,340	39,148	195,227	14,929	13,003	92,176	65,235	3,712	1,512	32,735	6,595	908,859
Jobbers, Dealers, Distributors	70,291	76,822	94,992	38,326	70,416	15,939	70,120	39,783	34,931	10,692	3,601	863,913
Construction, Maintenance	154,313	146,770	30,796	429	36,127	3,089	27,905	3,880	6,554	5,615	1,859	543,995
Contractors' Products	1,236	13,760	11,284	1,040	1,933	2,770	45,187	35,235	37,507	7,843	6,104	181,109
Automotive, excl. Tractors	3,666	33,220	149,704	22,302	1,531	19,390	169,106	230,973	8,848	41,800	29,082	744,541
Rail Transportation	46,141	84,789	33,908	319	40	223	26,421	3,179	4,686	2,636	380	411,835
Shipbuilding	4,003	19,783	2,218	170	158	82	562	413	407	19	45	28,470
Aircraft	.....	267	167	429	99	12	71	164	54	.....	46	1,545
Oil, Gas Drilling	2,830	7,316	4,415	543	27,031	2	2,237	66	54	80	18	83,381
Mining, Quarrying, Lumbering	1,998	4,936	5,395	261	382	233	1,422	397	221	347	14	27,468
Agricultural	4,319	7,297	39,552	5,748	117	3,220	12,744	2,792	8,261	8,652	424	99,528
Machinery, Industrial Equipment, Tools	18,263	68,353	65,144	21,527	9,932	9,394	25,378	8,915	1,293	9,061	5,780	267,053
Elec. Mach., Equipment	5,365	12,783	9,470	3,770	208	3,804	22,249	10,966	2,170	5,678	3,570	139,538
Appliances, Utensils, Cutlery	28	907	1,087	4,390	366	3,390	31,174	45,249	8,488	3,673	7,379	130,161
Other Domestic, Commercial Equipment	950	10,306	6,284	3,666	557	21,678	18,933	36,833	4,575	7,501	15,702	139,565
Containers	.....	9,869	471	40	.....	8,023	58,259	31,803	4,150	14,938	9,197	426,606
Ordnance, other military	.....	532	1,256	80	.....	57	85	69	41	.....	75	2,813
Unclassified	16,333	2,867	57,702	12,028	11,492	39,423	33,375	.....	1,147	3,616	37,033	418,220
Export	31,617	42,086	32,691	5,872	17,181	11,009	17,118	8,891	5,646	5,289	2,154	324,574
Total	364,693	581,811	741,763	135,869	190,573	233,914	627,581	463,320	130,545	160,775	129,058	5,743,174
*Less shipment to members of industry for conversion	398	18,457	84,172	1,033	12,543	14,960	45,551	2,340	3	19,654	1,506	479,463
Net total	364,295	563,354	657,591	134,836	178,030	218,954	582,030	460,980	130,542	141,121	127,552	5,263,711

* All of these shipments were made to the group classified as "Converting and Processing"

Reorganization of Germany Held Vital to Welfare of United States

Johns-Manville chairman, who surveyed conditions abroad recently, tells Conference Board that key to revival of western Europe is production but that production is being stifled by unwise political and economic policies

IN A SYMPOSIUM on the business outlook, sponsored by the National Industrial Conference Board in New York, Lewis H. Brown, chairman, Johns-Manville Corp., said no problem was more important to the United States or more pressing than the reorganization of the German economy as a part of the reorganization of western Europe generally under the Marshall Plan.

Mr. Brown, who made a two-months survey of economic conditions in Germany and western Europe this summer at the invitation of Gen. Lucius D. Clay, said that the key to revival of western Europe is production and that such production is dependent not only on coal, food and transportation, but also on revision of policies, both political and economic, which are retarding the flow of German commerce both inside and outside the country.

Repayment of Loans Possible

Outlining various measures which he believed should be taken, he said that the cost of starting western Europe on the road to recovery would amount to billions of dollars during the next five years, and that most of this would have to come from the United States in form of loans. However, he believed that if these loans were intelligently made, not as a relief but as an incentive to increase production, they could be repaid.

Other speakers on the symposium, which featured the 289th general meeting of the board at the Waldorf-Astoria, Sept. 25, included Dr. Charles O. Hardy, staff director, Joint Congressional Committee on the Economic Report, and Paul Mazur, Lehman Bros., New York, both of whom agreed that present inflationary forces have not yet been spent, with the former remarking that "we should not forecast a slump until some cause for such slump is discerned."

W. Gibson Carey Jr., head of the Yale & Towne Mfg. Co., Stamford, Conn., and new chairman of the Conference Board, presided at the dinner, later turning the meeting over to Dr. Virgil Jordan, president of the board, who commented briefly on the economic situation and introduced the other speakers.

Warning that Russia "is still waiting for a complete economic breakdown in the West to further her opportunities for conquest," Mr. Brown proposed the following policy changes:

1. Declare an end to reparations in capital goods and encourage German industry to increase production of goods for export in exchange for food.

2. Hold the 80,000 top Nazis accountable for their misdeeds but put the other millions back to work.

3. Invite the German nation to take part in the conferences on the Marshall Plan as an indication to the Germans that the time has come when they can begin to work their way back "as a member of the family of nations of western Europe."

4. Permit German exports and encourage them by foreign currency loans from the International Bank for Reconstruction and Development and by eliminating the red tape and bureaucracy of the local German governments and restrictions of military governments.

5. Build a central government for western Germany out of the present economic councils of the German states.

6. Abandon the Federal Reserve-type banking system and institute a central bank for western Germany.

7. Provide a new currency for Germany as soon as a central government with a balanced budget is in effect.

Mr. Mazur asserted that despite some maladjustments such as "frequent shots of adrenalin" experienced in connection with foreign aid, the American economy as a whole seems fairly in balance.

Dr. Hardy outlined briefly what he regarded as the chief forces leading to the present boom:

1. The great expansion of purchasing power brought about by wartime finance, involving the spending of vast amounts of new money which was a permanent addition to the purchasing power of the community; financing on short-term bonds which are practically money; and permitting incomes to go up more rapidly than either prices or the supply of consumer goods.

2. A backlog of consumer demand for durable goods, especially housing and automobiles.

3. A very high demand for all sorts of exports, supported so far as Europe is concerned by governmental expenditures for relief and loans. For Latin America, demand is supported by an inflationary boom in those countries.

4. Willingness of the population to spend freely because of accumulated liquid assets, high farm incomes, and because the fear of unemployment has subsided.

5. High level of investment, due to (a) high profits; (b) cheap money; and (c) high labor costs.

"I do not see," he concluded, "that any of these factors has spent its force. Nor do I see any factor working against them."

Swedish Ore May Help Increase German Output

BERLIN

Some time will be required before steel plants in the American and British zones of Germany can increase steel production to the 10,800,000-ton level permitted under the revised industrial plan for the two zones. Formerly, the quota was 5,800,000 tons. Current production is at a low of 200,000 to 250,000 tons monthly, or less than 3,000,000 tons annually.

Production now is based upon the availability of low-grade German ores but it is hoped that Swedish ore will be permitted to enter the country as before the war. The Swedes are finding it difficult to market ore available and are anxious to resume business with Germany. In fact, it has been learned that a special office for financing trade with Germany has just been set up in Stockholm by three leading Swedish banks. Nothing has been reported on this development so far by German or foreign publications.

From reliable sources, it is reported that primarily the financing of Swedish raw materials to Germany is contemplated. The office has been established with the aid of a former high official of the German Department of Commerce, a Dr. Ludwig who handled Swedish-German trade during the war and who now is a resident of Sweden. Ludwig was not a Nazi and has a high standing among Swedish bankers and business men.

Declining Trend In Tool Orders Seen Reversed

Many metalworking fields to benefit if predicted $500 million sales year materializes for tool builders

CLEVELAND

PROSPECTS for the machine tool building industry appear brighter over the next year than they have since 1942 when the all-time peak in machine tool demand was reached. Opinions as to the volume of new tools which will be ordered vary, but the prediction by Joseph L. Trecker, president, Kearney & Trecker Corp., Milwaukee, that sales will step up to $500 million in the next 12 months indicates the confidence generally felt by the industry.

This half billion dollar figure would be in sharp contrast to sales throughout the present year, which are estimated by H. H. Pease, president of the National Machine Tool Builders' Association and of New Britain Machine Co., New Britain, Conn., at $300 million, a volume which, nevertheless, is 50 per cent greater than for any prewar year. Increase in tool ordering, already being felt, has reversed the trend which with minor exceptions has continued since 1942. The pick-up in demand began in June following April and May levels which were the lowest months in ordering volume since before the war.

Tool Show Cited as Stimulant

The Machine Tool Show, with its attendance of 175,827 representatives of the metalworking industries, is cited locally as the largest single factor in the revival of tool demand. When the show ended it was estimated that during the two-week period at least $5 million in new orders has been pocketed by ten Cleveland exhibitors, with Warner & Swasey Co. bringing back the largest amount, or about $1.5 million. That company likewise led the Cleveland concerns in selling its floor models, with $150,000 worth sold.

The large volume of orders placed at the show was the forerunner of greater demand in the industries supplying the myriad components and materials for tool building. Order backlogs will be swollen particularly for foundries, steel mills, gear, electrical apparatus and motor manufacturers, carbide tipped tool producers, inspection and control device makers and the host of other suppliers of metals, materials handling equipment, optical goods, etc., to the machine tool industry.

GENERATOR STATOR: This piece of electrical apparatus weighs 185 tons and is the heaviest ever shipped in one piece from the General Electric Co. A generator stator for a 100,000-kilowatt turbine-generator set, it is shown being loaded on a special railroad car for shipment to a New Jersey power-generation station

Munitions Board Names Machine Tool Advisors

Thirteen representative manufacturers and users of machine tools have accepted invitations to become members of the Machine Tool Industry Advisory Task Committee of the Munitions Board.

The committee will assist the Munitions Board in formulating plans concerning the machine tool industry relative to industrial mobilization planning.

Members of the advisory committee are: John A. Bradner, president, Lees-Bradner Co., Cleveland; G. R. Burt, chairman of the board, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn.; Eugene C. Clark, Chambersburg Engineering Co., Chambersburg, Pa.; Henry J. Cupper, General Motors Corp., General Motors Building, Detroit; C. W. Fuller, General Electric Co., manufacturing division, Schenectady, N. Y.; F. V. Geier, president, Cincinnati Milling Machine Co., Cincinnati; Lee Hammond, Hammond Machine Builders, Kalamazoo, Mich.; H. A. Ingle, president, Consolidated Machine Tool Co., Rochester, N. Y.; H. E. Lasker, factory superintendent, Republic Aviation Corp., Farmingdale, Long Island, N. Y.; William J. Pearson, construction engineering department, Bethlehem Steel Co., Bethlehem, Pa.; J. H. Schreiber, chairman of board, General Engineering & Mfg. Co., St. Louis; C. J. Stilwell, president, Warner & Swasey Co., Cleveland; J. L. Trecker, Kearney & Trecker Corp., Milwaukee.

Steel Institute Begins Technical Meeting Series

AISI will hold a group of four regional conferences this fall in Philadelphia, Pittsburgh Chicago and Boston

AMERICAN Iron & Steel Institute is inaugurating a series of four regional technical meetings this fall at Philadelphia on Oct. 29, at Pittsburgh on Nov. 5, at Chicago on Nov. 14 and at Boston on Dec. 10.

On the morning session program for each of the four meetings the following speakers will explain the institute's technical and research program: Walter S. Tower, president of the institute; Dr. E. C. Bain, vice president of Carnegie-Illinois Steel Corp. and chairman of the institute's committee on general research who will explain the functions of his committee; and L. H. Winkler, metallurgical engineer for Bethlehem Steel Co. and chairman of the general technical committee who will outline the role of his group.

Session Speakers Announced

At the Philadelphia gathering, to be held at the Bellevue-Stratford, Quincy Bent, vice president of Bethlehem Steel Co., and G. D. Spackman, vice president of Lukens Steel Co., will be presiding officials at the morning and afternoon sessions, respectively. At the afternoon session W. S. Debenham, Carnegie-Illinois Steel Corp., will discuss "Developments in Refractories," E. H. Davidson, Carnegie-Illinois Steel Corp., will speak on "Steel Plates." C. R. Fondersmith, will investigate "Open Hearth Problems." E. I. Burke, Republic Steel Corp., has as his subject "Packaging and Loading."

J. E. Lose, vice president of Carnegie-Illinois Steel Corp., and J. L. Mauthe, vice president of Youngstown Sheet & Tube Co., will preside at the Pittsburgh meeting for the morning and afternoon sessions, respectively, to be held at the William Penn Hotel. C. L. Kent, Jones & Laughlin Steel Corp., plans to discuss "Hot Rolled Carbon Steel Bars and Semifinished Products"; S. D. Gladding, Bethlehem Steel Co., will outline developments in "Electric Furnace Steelmaking." C. R. Fondersmith will speak again on "Open Hearth Problems." E. I. Burke will also discuss "Packaging and Loading."

For the Chicago meeting at the Stevens Hotel presiding officers for the morning and afternoon sessions, respectively, will be A. P. Miller, general superintendent, Inland Steel Co., and E. M. Richards, vice president of Republic Steel Corp. C. L. Kent will speak on "Hot Rolled Carbon Steel Bars and Semifinished Products." F. H. Fanning, American Rolling Mill Co., has as his subject "Sheets and Strip." C. R. Fondersmith again reviews "Open Hearth Problems." E. I. Burke discusses "Packaging and Loading."

The Boston meeting will gather at the Copley Plaza Hotel with H. B. Jordan, vice president of American Steel & Wire Co., and J. H. McElhinney, vice president of Wheeling Steel Corp., presiding. J. R. Thompson, American Steel & Wire Co., will speak on "Wire Rods and Wire." C. W. Weesner, Sharon Steel Corp., has as his subject "Open Hearth Problems." C. R. Fondersmith outlines "Open Hearth Problems" and E. I. Burke will discuss "Packaging and Loading."

The institute plans to have a discussion and question period following each of these meetings. All institute members and representatives from member companies are invited to attend.

Wire Association Will Meet In Chicago on Oct. 20-23

Technical sessions and plant inspection trips will be featured at the annual convention of the Wire Association which meets in Chicago Oct. 20-23.

Inspection trips include tours of the wire mill of Republic Steel Corp. in Chicago and the Hawthorne works of Western Electric Co.

Technical sessions will consist of papers concerning many topics and symposiums on "Improvements in the Wire Industry in the Last Ten Years," "Outlook and Present Trend of the Wire Industry" and "World-Wide Wire Industry."

All activities of the convention will be held at the Hotel LaSalle, and hotel reservations will be made for members of the association only at that hotel.

Calendar of Meetings . . .

Oct. 6-7, Packaging Machinery Manufacturers Institute: 15th annual meeting, Hotel Sheraton, Springfield, Mass. Institute headquarters are at 342 Madison Ave., New York.

Oct. 6-10, National Safety Council: National Safety Congress & Exposition, at Stevens, Congress, Palmer House and Sherman hotels, Chicago. Council headquarters are at 20 N. Wacker Dr., Chicago.

Oct. 8, American Society for Testing Materials: District meeting, Rackham Memorial Bldg., Detroit.

Oct. 9-10, Porcelain Enamel Institute: Annual meeting, Cleveland.

Oct. 10, American Ceramic Society, Refractories Division: Fall meeting, Bedford Springs Hotel, Bedford, Pa.

Oct. 15-17, American Society of Civil Engineers: Fall meeting, Hotel Roosevelt, Jacksonville, Fla. Society headquarters are at 33 W. 39th St., New York.

Oct. 15-18, Electrochemical Society: Boston Congress, Copley-Plaza Hotel. Society secretary is Colin G. Fink, 3000 Broadway, New York.

Oct. 16, American Society for Testing Materials: District meeting, Benjamin Franklin Hotel, Philadelphia.

Oct. 16-17, National Conference on Industrial Hydraulics: Sponsored by Armour Research Foundation and Graduate School of Illinois Institute of Technology, Hotel Continental, Chicago.

Oct. 18-24, American Society for Metals: 29th annual national metal congress, Chicago. Society headquarters are at 7016 Euclid Ave., Cleveland.

Oct. 20-22, Iron and Steel Division and Institute of Metals Division of ASTM: Fall meeting, Hotel Stevens, Chicago. Headquarters are at 29 W. 39th St., New York.

Oct. 20-24, American Welding Society: Annual meeting, Sherman Hotel, Chicago. Society secretary is M. M. Kelly, 33 W. 39th St., New York.

Oct. 27-29, Western Division, American Mining Congress: Annual convention, El Paso, Tex. Julian D. Conover, 309 Munsey Bldg., Washington, secretary.

Oct. 30-31, Nov. 1, American Society of Tool Engineers: Fifteenth semi-annual meeting, Statler Hotel, Boston.

Oct. 31, Illinois Mining Institute: 55th annual meeting, Hotel Abraham Lincoln, Springfield, Ill. Secretary-treasurer of the institute is B. E. Schonthal, 28 E. Jackson Blvd., Chicago.

Nov. 2-5, National Tool & Die Manufacturers Association: Annual meeting, Benjamin Franklin Hotel, Philadelphia. Executive secretary is George S. Eaton, Union Commerce Bldg., Cleveland.

Nov. 3-7, National Electrical Manufacturers' Association: Second international lighting exposition and conference, Stevens Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Nov. 4-7, National Airport Show and Institute: Cleveland Public Auditorium, sponsored by the Air Foundation of Cleveland and the National Aeronautic Association.

Nov. 5-7, American Society of Body Engineers: Second annual technical convention, Rackham Memorial Bldg., Detroit. Society headquarters are at 100 Farnsworth Ave., Detroit.

Nov. 6-7, National Founders Association: Annual meeting, Waldorf-Astoria, New York. Association executive vice president is L. E. Roark, 120 S. LaSalle St., Chicago.

Nov. 7-8, Pittsburgh Conference on X-ray and Electron Diffraction: Fifth annual meeting. General chairman is Harold Klug, Mellon Institute of Industrial Research, 4400 Fifth Ave., Pittsburgh.

Nov. 10-13, American Institute of Steel Construction: 25th annual convention, Roney Plaza Hotel, Miami Beach, Fla.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Director of new Federal Mediation & Conciliation Service says his agency will encourage labor and management to settle disputes without federal intervention. Agency would intervene only when necessary to protect public interest

THE NEW Federal Mediation & Conciliation Service will inject itself into as few labor disputes as possible, according to Cyrus S. Ching, its director. It will intervene only in the public interest, and its men will not be permitted to exert pressure on either party to a dispute. That is the policy, Mr. Ching believes, that is called for to carry out the intent of Congress and the American people in setting up his new independent agency as successor to the former U. S. Conciliation Service.

"As we look at the situation, the parties to a dispute have the primary responsibility," Mr. Ching told STEEL. "We are not going to do anything to encourage them to dodge this responsibility. We will encourage them to use every and any possible means of reaching an agreement without necessitating intervention by the federal government. They should use state machinery where that exists, or they should appoint an arbitrator, to resolve difficult situations when outside help is necessary.

"I am prepared to judge the effectiveness of our procedure by the absence of fire alarms, rather than by the number of fires we put out.

"We have good men in the Mediation Service—just as good men as you will find in any corporation. I am looking to them to go out and get acquainted with the managements and the labor leaders in their territories and get to know their problems and their situations. If they do their work properly, they will help bring management and labor together, and make it easier for the parties in dispute to reach a settlement by their own efforts.

"If our field men work in this spirit, there will be fewer and fewer cases in which they are called on to intervene. If one of our regional men reports having to handle a lot of disputes, I will be inclined to think he has failed in his efforts at preventing trouble. On the other hand, when I get few trouble reports from any region, I will be inclined to feel the man there is doing a fine job."

The Mediation Service has few rules. The purport of its General Order No. 1 is that confidences disclosed by either party in a dispute must be fully protected. Mr. Ching proposes to formulate as few rules as possible; rather, he wants a flexible situation in which he and his associates can use their judgment in handling any problem as it arises.

For example, circumstances had much to do with the fact that the Washington headquarters intervened in the dispute between a number of shipbuilders—mainly Bethlehem—and the Industrial Union of Marine & Shipbuilding Workers of America—CIO. John Green, the union president, called on the Navy and the Maritime Commission for help in this 3-month old strike, pointing out that construction work on new Navy cruisers and needed repairs on Maritime Commission vessels were held up. It was after a conference with these agencies that Mr. Ching's agency agreed to take the dispute out of the hands of the New York regional office.

Incidentally, the shipbuilding dispute was handled by William N. Margolis who, as assistant director of the mediation staff, is third man in the Mediation & Conciliation Service. That left in reserve, in case Mr. Margolis was unable to get a settlement, Howard T. Colvin who, as associate director, is the second in command, and, finally, Mr. Ching.

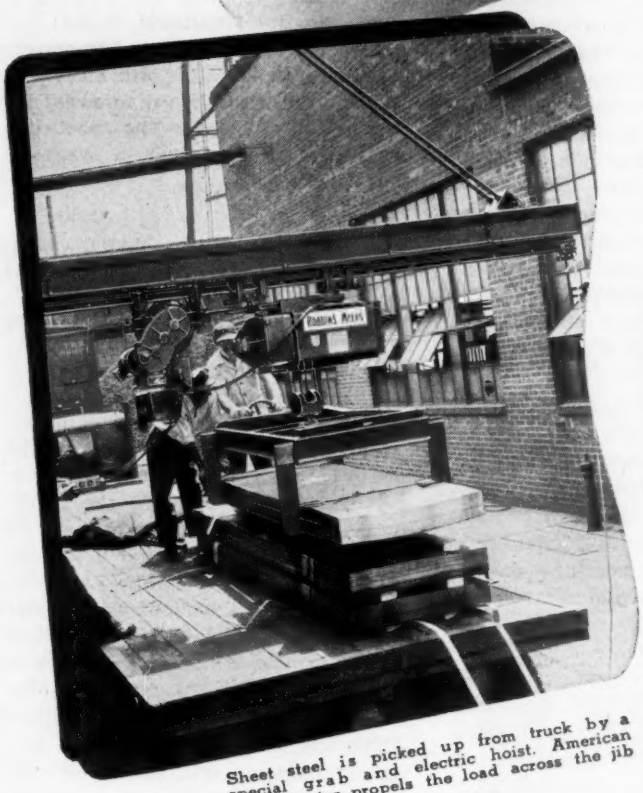
PRICE INVESTIGATORS: These members of a joint congressional subcommittee hear about price increases from consumers, merchants and producers in the New York area. Other subcommittees are holding similar hearings in other cities. Left to right: Rep. Clarence E. Kilburn (Rep., N.Y.); Rep. Edward J. Hart (Dem., N.J.); Seated: Rep. Robert F. Rich (Rep., Pa.); Sen. Raymond E. Baldwin (Rep., Conn.); and Sen. Ralph E. Flanders (Rep., Vt.). NEA photo

To Extend Trade Practice Codes

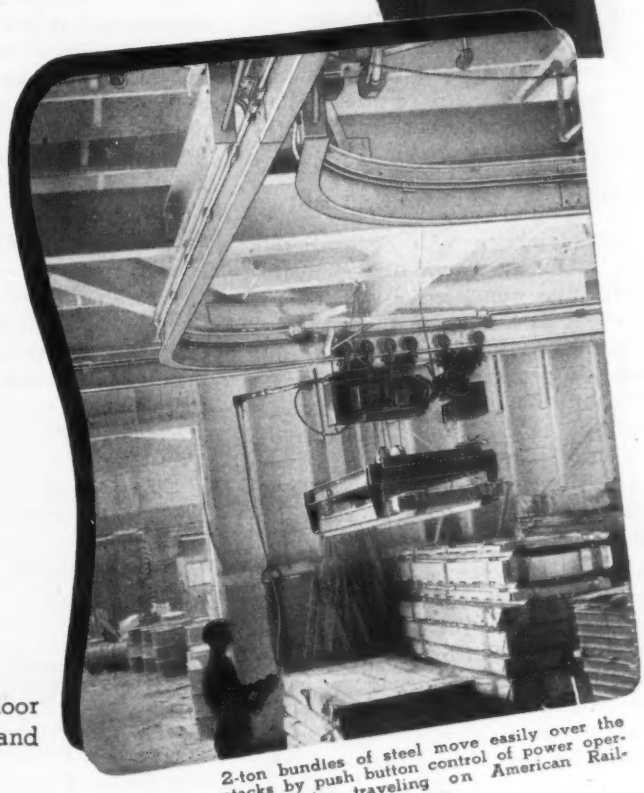
The Federal Trade Commission has transferred 15 more experienced employees to its Trade Practice Conference unit, and is preparing to enroll more industries under trade practice agreements. But informed observers are convinced that in making these moves the commission actually is rendering lip service to the idea of encouraging antitrust law compliance through the voluntary cooperation of business men.

In fact, the commission has made it clear that its chief reliance in enforcing the antitrust laws will continue to be on legalistic machinery. The commission has warned businessmen that participation in a trade practice agreement by no means

Steel goes UP and OVER



Sheet steel is picked up from truck by a special grab and electric hoist. American MonoTractor propels the load across the jib and into warehouse.



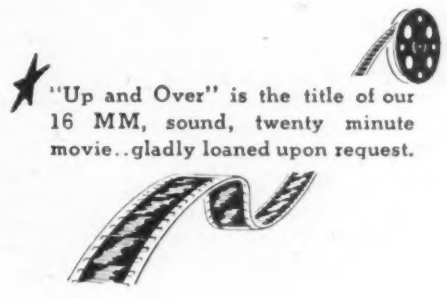
2-ton bundles of steel move easily over the stacks by push button control of power operated carrier traveling on American Rail-Master Track.

Hundreds of plants are eliminating much of their floor congestion by installing American MonoRail "Up and Over"* Handling Systems.

In these particular plants steel goes up from truck, is transported overhead, and stacked in high piles for subsequent fabrication. Increased production at lower costs has resulted.

With "Up and Over" type of handling, from receiving to shipping, an overhead track or crane system does a better, quicker job with less maintenance.

Let an American MonoRail engineer show you how an overhead system will increase your production and pay for itself in a very short time.



*"Up and Over" is the title of our 16 MM, sound, twenty minute movie..gladly loaned upon request.

THE AMERICAN MONORAIL COMPANY

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guarantees immunity from punishment for past offenses. By signing an agreement, a business man may have his slate wiped clean provided his offenses, if he has committed any, have been of a very minor character. But there will be no forgiveness for more serious violations.

Thus ends a controversy over enforcement procedure in which the commission was engaged all through 1946 and into August of this year. One side, with White House backing, felt that the commission's past policy of bringing action against individuals and single corporations invited noncompliance because under this policy the chances of being singled out as a target were about on a par with the chances of being struck by lightning. This side favored the placing of whole industries under trade practice agreements, with the understanding that faithful observance of the codes would bestow full atonement for past sins.

Immunity Provision Criticized

Commissioners who opposed this idea said they feared that many industrialists would agree with tongue in cheek to live up to these codes—that many would seize on the trade practice program merely to obtain immunity for old violations. Furthermore, a good many key jobs in the Federal Trade Commission are based on the use of legalistic methods, so that there was general resistance to the proposed reform.

When the commission on Aug. 20 issued its first statement of policy in regard to the settlement of cases by trade practice conference and stipulation agreements, it was noted that the policy had been reached by "unanimous vote" of the commissioners. The first impression was that the legalists had won a knockout victory; that impression was created by the numerous limitations set on immunity granted through the trade practice conference approach. Since then the commission has tended to confirm this impression by stepping up its campaign for punishment of alleged violations of the antitrust laws, and it has shaped up its formal complaints in such a way as to charge deliberate violation of the Clayton and Federal Trade Commission acts. For example, the major charge against the steel companies in the new steel case is that the steel industry uses an illegal price system as a result of an industry conspiracy.

The policy statement issued in August may result in putting a damper on the commission's plan to invite at least 15 more industries to participate in setting up trade practice agreements by next June 30. Under the new policy it is difficult to see how the commission can bait its hook attractively so as to evoke enthusiasm among businessmen.

"Trade practice conference rules," the statement says plainly, "have no force of law in themselves. . . An agreement by a member of an industry to abide by the rules is an expression of intention to abide by the basic law.

"It is not the policy of the commission," it continues, "to grant the privilege of settling cases through trade practice conference on stipulation agreements to persons who have violated the law where such violations involve intent to defraud or mislead." A trade practice agreement will bring no forgiveness, the statement goes on, to businessmen guilty of "false advertisements of foods, conspiracy or monopolistic practices, or violation of the Clayton Act."

The coming year gives signs of being the commission's most active in many years in issuing complaints and seeking court sanction to make them stick. It already has a sizable program for October. During this month it will start hearings on its complaints against two industries, the steel industry and the corn products industry. The Supreme Court has set Oct. 20 and 21 to hear arguments in the cement case. This case has come up from the Seventh Circuit Court of Appeals and the commission seeks reversal of the adverse decision it received from the lower court.

Munitions Board Moves

The Army and Navy Munitions Board, soon to be rechristened under the National Security Act as the Munitions Board, has just moved its quarters from the Navy Yards and Docks building in Arlington, Va., to the Pentagon.

Communications Industry Enrolled

The communications industry is the first to be enrolled in the Army's new Organized Reserve Corps. Participating agencies are American Telephone & Telegraph Co., General Electric Co., Graybar Electric Co., International Telephone & Telegraph Corp., the Radio Corp. of America, and the U. S. Independent Telephone Association.

Under the industry affiliation program, special service-type units will be trained, and kept in readiness, for any future emergency. The affiliation idea is not new, since in both world wars business and industrial concerns sponsored various types of affiliated units. Other industries, mainly those of a service character, will be similarly enrolled in the near future.

Board Invites Inland Official

Clarence B. Randall, vice president, Inland Steel Co., has been invited by the Army and Navy Munitions Board (shortly to become known as the Munitions Board) to serve as a member of its Manpower Consulting Group. This will meet periodically with the board to assist in formulating plans for the most effective use of manpower in event of another war.

Plan $1 Billion Research Program

Members of the law-writing staff of the House Armed Services Committee are working on legislation that would set up the research and development programs of the armed forces on the basis of a total of $1 billion or more annually. It would permit organization of the research and development work of the Army and Air Forces along the lines of the Navy's Office of Naval Research, as authorized under Public Law 588, Seventy-ninth Congress. Some changes in the latter law, which would expand the Navy's present powers in regard to research, also are being considered.

The contemplated legislation envisions widest utilization by the armed services of civilian scientists and research men. Each of the three service secretaries would be authorized to establish civilian research advisory committees as needed.

Dr. Bush Heads Research Board

Dr. Vannevar Bush has been appointed by President Truman to the chairmanship of the Research and Development Board created under the National Security Act of 1947 as a key unit in the new National Military Establishment. The purpose of the board is "to advise the Secretary of Defense as to the status of scientific research relative to the national security, and to assist him in assuring adequate provision for research and development on scientific problems relating to the national security."

Dr. Bush headed up the Office of Scientific Research and Development during the war and more recently has headed the temporary Research and Development Board set up jointly by the Army and Navy in 1946.

Joint Army-Navy Specifications Are Approved

First of a series on practices and processes according to requirements of the services are announced

JOINT Army and Navy standards and specifications for a number of practices and processes have been approved by the War and Navy Departments, it was learned last week.

Approved in the first of a series of standards and specifications for both services were: JAN (Joint Army-Navy) STD 2, Drawing Sizes; JAN-STD 12, Abbreviations for Use on Drawings; JAN-STD 19, Welding Symbols; and JAN-STD 102, Anti-friction Bearing Identification Code.

The latter, JAN 102, supersedes the published Army-Navy numbering system for anti-friction bearings, of June 1, 1945. Establishment of joint drafting standards, it is said, will promote practices for preparation and interpretation of drawings designed to eliminate errors in design, production, inspection and maintenance, incident to earlier or faulty drafting practice, among other gains.

In addition to approved standards, the Army-Navy Joint Specification Board is developing other standards for drafting use covering general practice; format for production drawings; format for construction drawings; dimensioning and tolerancing; screw thread; surface roughness; electrical-electronic symbols; mechanical symbols; non-destructive test symbols; and standards governing welding nomenclature and definitions; welding charts; and color codes for gas cylinders and pipelines.

Specifications being developed according to joint requirements include ordnance, chemical, and various other items.

Acme Steel Co. Host to 30,000 at Open House

Acme Steel Co. was host to approximately 30,000 visitors at an open house of its Riverdale, Ill., strip steel rolling mills, Sept. 30 and Oct. 1. In addition to witnessing the processes of hot and cold rolling, pickling, electrogalvanizing and coating of strip steel in a two-mile plant tour, the guests were shown a quarter mile of exhibits of 104 manufacturers of products made from strip steel.

AFA Will Sponsor Research On Malleable Iron Castings

The malleable division research committee of American Foundrymen's Association will sponsor a study to establish the most suitable microstructure for pearlitic malleable iron castings to be hardened selectively by flame or induction heating, S. C. Massari, technical director of the association, has announced.

Carl F. Joseph, technical director of Central Foundry Division of General Motors Corp., Saginaw, Mich., is chairman of the malleable research body which is directing the project. Information obtained is expected to indicate the optimum microstructure essential to a practical commercial process of selective hardening, including data on the method and speed of heating and quenching, hardness gradients, quenching media and other problems.

The association has also approved investigations proposed by the research groups of the aluminum and magnesium and brass and bronze divisions, Mr. Massari said.

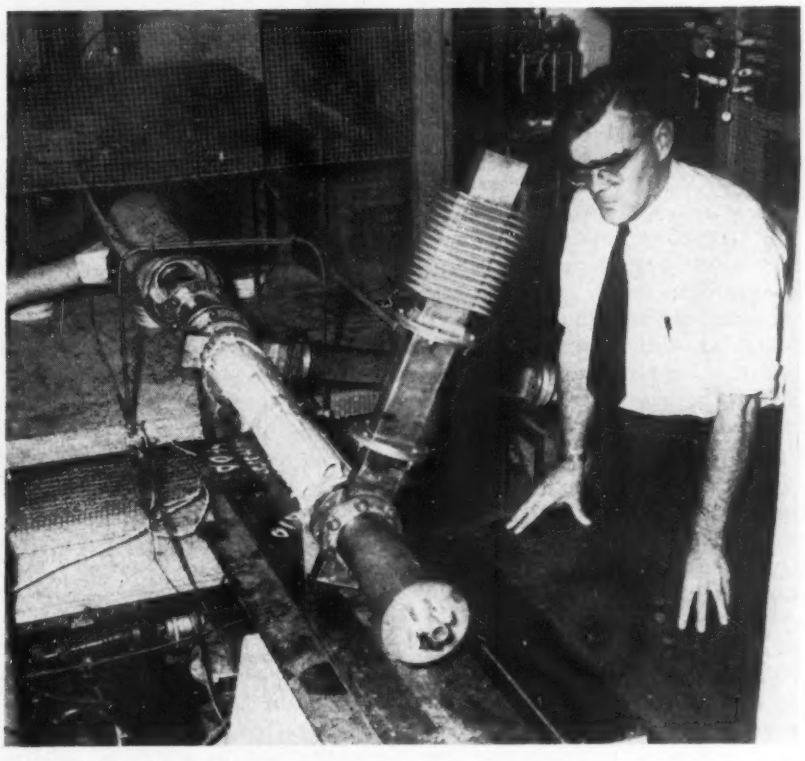
A study of the centrifugal casting of aluminum and magnesium alloys, conducted during the past year by the light metals division, will be continued and expanded. R. F. Thomson, metallurgist with International Nickel Co., Detroit, is research committee chairman.

Dr. Blake M. Loring, head of the nonferrous division of the Naval Research Laboratory, Washington, heads the brass and bronze group which will undertake a comprehensive investigation of tin bronze test bars.

GE To Build Motor Plant in California

Judson-Pacific-Murphy Corp. will fabricate and erect structural steel for General Electric Co.'s new $2 million motor plant in the San Francisco area at San Jose. Fabrication will be started soon and erection is planned to start in January.

The plant will make induction motors for irrigation pumps and general industrial purposes.



NEW ATOM SMASHER: Latest piece of atom-smashing equipment is this electron linear accelerator, shown here by its developer, Dr. William W. Hansen, director of the Stanford University microwave laboratory. The machine has produced million and a half-volt electrons and it is expected billion-volt electrons will be produced in a projected larger model. NEA photo

Britain Pushing for Greater Exports of Manufactured Goods

Higher quotas next year seen attainable only if more coal and steel are made available and then possibly at expense of domestic users. Pig iron and steel output shows some improvement in August

BIRMINGHAM, ENG.

FURTHER cuts in Britain's home consumption of domestic manufactured goods are in prospect, with metalworking industries being exhorted to boost production of goods for export.

Goal of next year's huge export program is an increase of 160 per cent of the 1938 total, or £31 million more a month.

The automobile industry, for example, has been asked to produce £6 million worth of autos a month for export by the end of next year. Sir Miles Thomas, vice chairman of the Nuffield organization, says the industry can meet this figure only if sufficient steel is available but adds: "If the industry gets its prewar percentage of steel not only will it be able to meet the export target but there will be a substantial margin for the home market."

Coal Production Vital

Whether this and other British industries get the steel depends largely upon availability of coal. At present the outlook is anything but encouraging. Due to a prolonged stoppage in the Yorkshire coal field where work has just been resumed, district steelworks have had to make inroads into stocks of fuel which they had accumulated for the winter, and blowing in of a blast furnace has had to be delayed because of insufficiency of coking coal.

Introducing the government's plans for overcoming the present economic crisis through greater exports, Sir Stafford Cripps declared: "So far as materials are concerned the most important are coal and steel. However much of the supplies of coal fall short of our total requirements, it is vital that sufficient should be provided for the main export industries to enable them to achieve their task, even if this were to mean that we had to go somewhat short elsewhere. We require 24¼ million tons for industry for the winter six months, and this we must arrange to get.

"As to steel, this is a matter of allocation, and of the full implementation of the allocations. We must find the extra steel we need for exports, mainly from the savings on our capital investment program at home. With estimated production of 14 million tons of steel in the next year we should be able, with the economies in home use, to find all we want for our export program, though the steel industry will have to show itself very flexible in producing the qualities that are needed. Overall, an extra quarter of a million tons a quarter will be required for exports and this must come off home consumption. On the best estimates that we can make, the export program will require 4 million tons of steel for its full execution in the next twelve months, bearing in mind that many goods require six to twelve months for manufacture. In addition to this, there are the priorities for our own production of coal, power and transport, so that what is left over will mean a severe cut in our domestic capital program."

Recent production figures have shown some improvement, the August output of pig iron being the highest since January, or a weekly average of 147,300 tons. Steel production was also up in August and in the last week of the month attained an annual rate of more than 13½ million tons.

A pronounced shortage of semi-finished steel, particularly billets and sheet bars, is limiting the activities of rerollers, who are inundated with orders for sheets, strip, small bars and sections. Bookings extend well into 1948 and only priority industries receive close to their required tonnages. Collieries, railroad and power plant erectors will get larger allocations in the final quarter.

Users of foundry pig iron are hoping that more blast furnaces will be blown in during the next few weeks to help satisfy the demands for high phosphorous grades for light castings. The needs of the steel industry are so extensive, however, that any relighted furnaces will probably chiefly produce basic iron.

Belgo-Luxemburg Union's Trade Agreements Spur Exports of Much-Needed Materials

LIEGE, BELGIUM

FOREIGN trade by the Belgo- Luxemburg Union is being stimulated by commercial agreements signed or being negotiated with other European countries. Currently approximately 50 per cent of the combined output of Belgium and Luxemburg is produced for exports. Deliveries of steel products are relatively quick compared with those of other countries, despite strong demand both in domestic and foreign markets.

Steel production in the two countries continues to climb and in the first half of this year was 33 per cent above the comparable period of 1946. A total of 49 blast furnaces are in operation in the two countries, Belgium with 32 and Luxemburg 17. Iron ore is being received steadily and in sufficient volume.

Labor trouble, however, is a threat to continued high production. A strike of metallurgical workers in the Liege district has involved about 22,000 employees in metalworking industries. Cause of the strike is somewhat obscure and is not approved by labor leaders. It is related to a claim on the part of the workers to share in a form of bonus allowed to the iron and steel concerns to make up for a decrease in steel prices. Because the situation is peculiar to the metal industry, the strike is not likely to spread to other fields.

An agreement between the Union and France has been renewed. France, under its terms, will supply 1542 metric tons of special and tool steels, 6000 tons of bauxite, 1000 tons of silico-aluminum and a considerable tonnage of ferroalloys, 8000 private automobiles, 1500 automobile engines, 3000 light trucks and 1500 heavy trucks up to 5 tons, and quantities of foodstuffs and other products. The Union will supply 50,000 metric tons of copper, 25,000 tons of zinc and tonnages of other nonferrous metals, special railroad freight cars, ships and diesel engines, machinery and machine tools.

An agreement with Italy to run until June 4, 1948, is on the point of being ratified and specifies the Union will supply among other products

10,000 metric tons of manganese ore, 10,000 tons of iron and steel scrap, 2000 tons of hematite pig iron, 50,000 tons of heavy steel products, tonnages of wire products, 20,000 tons of copper ingots, 15,000 tons of electrolytic copper, machinery and machine tools. The Italians will supply foodstuffs, chemical products, soft goods and timber.

To help in development of the railroad electrification program in Belgium, inquiries have been issued for 605 electric locomotives, all to be delivered before the end of 1951.

The recent exhibition of Research & Industrial Control commemorating the centennial of the Association of Engineers of the Ecole de Liege, part of Liege University, met with great success and a permanent display of the latest types of control methods and equipment is planned at the university. Engineers and industrialists from all parts of the world met during the celebration to discuss their common problems. The main theme of these discussions was the necessity of modernizing and improving all means of production, and the exhibits included a range of industrial control apparatus unequalled elsewhere in Europe today. Electronic instruments, particularly, attracted the interests of men whose formal technical education had been completed long before these devices were developed. Because the majority of the instruments were of American origin, that country's methods are considered as the examples to follow.

Russia Seeks Dominant Role in European, Asiatic Steelmaking

Study of Soviet steel industry by Department of Commerce reveals war rehabilitation and projected expansions will raise capacity 30 per cent above 1940 level by 1950. Postwar higher output schedules fall short

WASHINGTON

SOVIET Russia is striving for the position of dominant steel producer of Europe and Asia, according to a survey of its iron and steel production just completed by the Department of Commerce.

Actually, at the time of the war, the Soviet industry had attained a position "as the most dynamic, if not the leading industry of its kind in Europe," the survey reported, having outstripped both France and the United Kingdom, and with Germany's lead as the only other superior producer rapidly being cut down.

The war disclosed, however, that a major mistake had been made in concentrating the bulk of steel plant and furnace capacity of the industry in southern Russia, which was vulnerable to German conquest.

One after another, the survey reports, the largest mills of the Ukraine, some of which, like Zaporozhe, had required five years to build, were over-run. For the duration of the war some 60 per cent of Russia's iron and steel capacity, with the Donets coal basin, the Krivoli Rog and Kerch iron basins, and the Nikopol manganese mines, were lost to the Soviet. In detail, some 65 per cent of its prewar coal output, 64 per cent of iron ore and 48 per cent of manganese production, were thus knocked out.

By 1950 the Russians hope to rehabilitate this area completely; and restoration of this capacity, plus new construction scheduled at several interior plants, should raise the country's capacity to about 30 per cent over the 1940 level. Compared to capacity of the United States steel industry, however, projected Russian output by 1950 would be about the same as that of this country in 1913, or pre-World War I.

By the Russians' own reckoning, the survey continues, it will require another 15 years of forced-draught expansion before Soviet steel production can hope to meet all its own domestic needs. By that more distant time, as indicated in statements of Stalin and other sources studied by the department, the goal is 50 million tons of pig iron and 60 million tons of steel per year. Thus, not within the foreseeable future, does the Soviet industry appear likely to be able to generate a surplus of steel for the world market.

Token Exports Unimportant

However, some token quantities of Soviet iron ore, coke, steel sheets and steel ingots have begun to appear in adjoining countries.

There is little likelihood, says the department, that such exports will assume importance in the near future.

In fact, the report recalled, much of Russia's prewar efficiency stemmed from American mills, equipment, and technical aid.

Russian optimism as to postwar output has not materialized. Their industry officials, following launching of restoration in 1945, had anticipated sizable increases of 56 per cent in pig iron, 35 per cent in steel, and 30 per cent in rolled steel, which actually turned out, in comparison to 1944, as a 21 per cent pick-up in pig iron, 15 per cent in steel, and 18 per cent in rolled steel.

AGREE ON RUHR MINES: United States and Britain have agreed on a broad plan for increasing the output of the Ruhr coal mines in Germany, a key factor in the Marshall Plan. Agreement gives U. S. and Britain an equal voice in supervision and control of the rich mining district which lies in the British half of the merged western occupation zones. Shown as they announced the agreement, left to right: Sir Mark Turner and Sir William Strang of Britain; Willard Thorn, assistant secretary of state; and Gen. William Draper, United States Army. NEA photo

HOW MUCH COST CAN A SAW BLADE CUT?

Plenty—if it's made of molybdenum high-speed steel. Most of the major hacksaw blade manufacturers have standardized on molybdenum steels.

Why? Because molybdenum steels for saw blades are not only cheaper than 18-4-1, but they last much longer. Records made in the customer's plants have proved the wisdom of their choice.*

The same reasons—10¢ to 20¢ a pound saving over 18-4-1; more tools for the same gross weight of steel; better cutting performance; longer operation between regrinds—are back of the widespread adoption of molybdenum steels for all sorts of metal-working tools.

If you'll compare actual tool costs on any particular job, we think you'll discover why it pays to specify molybdenum high speed steels.

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MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Ford Motor Co. becomes articulate under new regime, with top officials talking frequently and frankly on organization's aims. Finance Director Crusoe assures industry company plans nothing freakish

DETROIT

CORPORATE loquacity is one thing of which in years past the Ford Motor Co. could never have been rightly accused, in fact quite the reverse. However, as many know, there have been some changes made, and over the past year, there have been more major addresses delivered by Ford officials than were made by the old regime in ten years. Henry Ford II, president, E. R. Breech, executive vice president, Harold Youngren, director of engineering, L. D. Crusoe, director of finance, John S. Bugas, director of industrial relations, and others have presented lengthy discussions on a wide variety of company activities never heretofore explored.

As expressed in a recent talk by Mr. Crusoe, "The Ford Co. is becoming articulate . . . but . . . I am afraid a lot of people are looking for something squirrelly to happen at Ford—some revolutionary move designed to put us on top overnight. I would like to assure you that such is not the case. We have nothing freakish in mind. Do not look to Ford for engines run on sea water, bodies equipped with collapsible wings, or anything of the sort. We are just trying to be sound and progressive. Our reorganization is geared to the national system of free enterprise and orthodox competition. You do not have to be concerned that Ford will embark upon any venture which will work unnatural hardships on our competitors, interrupt the normal flow of business, or upset the national economy."

Last week in Cleveland, Mr. Ford made another of his frequent public appearances, addressing the Automotive & Aviation Parts Manufacturers. His plea for accelerated production to insure peace and freedom was a well-written commentary, delivered in a forthright and sincere manner. It is doubtful if he will ever be a Fred Crawford or a Boss Kettering as far as public speaking is concerned, but he has a long time ahead to practice and at least must be given "E" for effort. Spotted through the audience of 600 were most of the top Ford administrative talent, along with 20 or more lesser lights, and watching their expressions as Mr. Ford spoke, you could tell they were all giving silent encouragement to the boss.

This week there will be two more Ford treatises presented, before a dinner meeting of the Detroit section, Society of Automotive Engineers, at Dearborn Inn. Mr. Breech will offer, "A Challenge to Engineers," and Mr. Youngren will follow with an analysis of "Passenger Car Design—Past, Present and Future." Certainly the days of silence at Ford are done; honors on this score can now be transferred to Chrysler Corp.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,793	140,738
April	449,388	248,108
May	393,629	247,620
June	418,919	216,637
July	393,932	331,100
August	360 221*	359,111
September	447,750*	342,939
October		410,510
November		380,664
December		380,908
12 mos.		3,268,456

* Preliminary.

Estimates for week ended:

Sept. 13	103,095	88,888
Sept. 20	109,734	89,826
Sept. 27	103,121	83,993
Oct. 4	108,000	91,925

1947 To Be Second Best Year

While on the subject of speeches, it may be apropos to note the comment made in Atlantic City, N. J., last Friday by M. E. Coyle, executive vice president of General Motors, who was reviewing the outlook for the automobile industry before a meeting of the Pennsylvania Automotive Association. He forecast total production of cars and trucks this year should be in the area of 5,000,000 units, making 1947 the second highest year in history as far as U. S. production is concerned, exceeded only in 1929 when output was something over 5.3 million.

"With all our difficulties," Mr. Coyle concluded, "we should not complain about a year in which our volume possibly will attain the second highest level in history. Opinions vary as to the peak volume the industry will attain in any single year or the period for which high volume will continue. We may reach 4,500,000 passenger cars in 1948, but I do not think any single year will exceed 5,000,000 passenger vehicles. As we have not exceeded normal replacements since the end of the war, we should expect the demand to continue for three to five years. As we are already producing trucks at the rate of 50 per cent above the prewar level, the period of shortage there will not extend so long—in fact, there are already some indications of slowing of demand on the heavier trucks. After the shortage has been satisfied we will have normal replacement volume in trucks, so the outlook is favorable for some time to come."

Analyzing some of the problems occasioned by short steel supplies, Mr. Coyle said the full effects of additional steel rolling capacity now being installed would not be felt until the first quarter of 1949, resulting in a belief among General Motors officials that difficulty would be experienced in increasing production materially until the last half 1948. The 60 per cent increase in cold finishing capacity now under way ultimately will solve the motor industry's troubles in respect to sheet and strip steel, although Mr. Coyle added there is no certainty of the availability in adequate quantity of pig iron, copper, lead, zinc or tin — basic materials which so far have not limited production because of the limits imposed by steel supply.

How Much for Amortization?

These are rough days for cost accountants deciding how many inflated corporate dollars to set aside for equipment amortization, new tooling programs, etc. The old yard-

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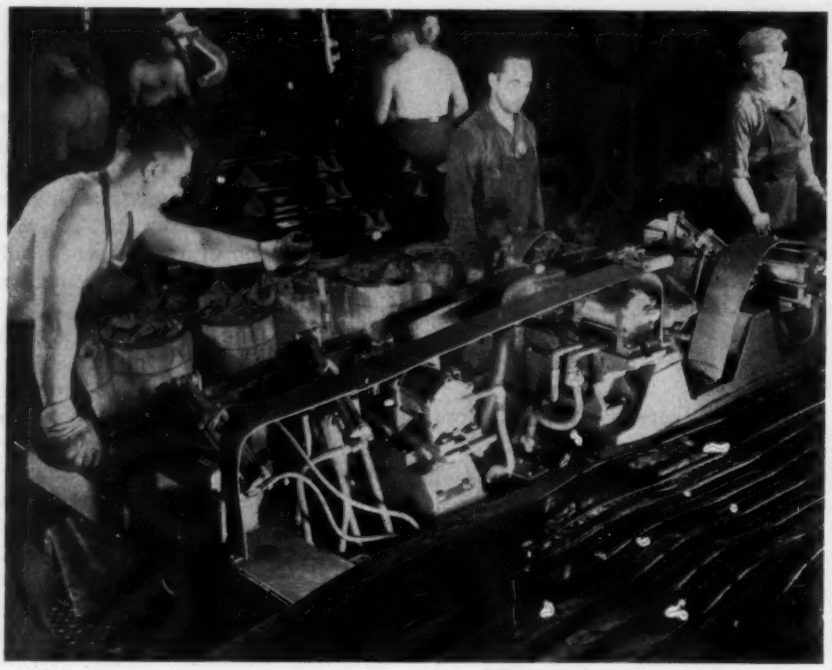


WELDING FRAMES: Box girder type frames for Chevrolets are being welded at the Janesville, Wis., assembly plant of GM's Chevrolet Motor Division, which recently celebrated its twenty-fifth anniversary

sticks of standard "dollar accounting" are unreliable in today's economic weather, as steel, auto and other industries are discovering when they check the cost of replacing old machines or undertaking plant expansion and retooling. Brushing aside for the moment the facetious comment of one well-known executive to the effect he kept four different balance sheets—one for customers, one for suppliers, one for stockholders and one for the tax collector—it becomes apparent that high dollar profits are vitally necessary for a company actually to remain solvent on its books and to continue to keep plant and machinery up to snuff.

Consider, for example, the cost of tooling a line of, say, about eight body styles for a single make of automobile, approximately $50 million, reportedly 2½ to 3 times the prewar figures. For a large corporation like Chrysler or General Motors, which does not have complete interchangeability of bodies between different makes, the complete retooling of the entire line is almost out of the question from a cost standpoint. Result, in the case of General Motors, at least, is that major retooling is being confined to one line of bodies for 1948, and the following year a second line will be changed over. Another result conceivably could be a reduction in the number of different body types in a single series. Again citing GM, where body styles have encompassed both the so-called "fast" back and the "notched" back in two-door and four-door sedans, along with coupes, convertibles, station wagons and limousines, a saving might be realized by concentration on a single type of sedan.

Of course, tooling costs are apportioned to the cost of the car, over a certain projected production, and because most present passenger cars have had the same basic body type since 1942, tooling charges have been pretty well washed out, to say the least. Incidence of a major tooling program for succeeding models would certainly mean another kick-up in price. That is why Kaiser-Frazer, Studebaker, and the 1948 Packard line carry price tags which at first glance appear out of line with their competition. They have to bear a proportion of the heavy tooling expense that is involved in this introduction.

Turn Down Pension Plan

Rejection of a proposed pension to be incorporated in its new contract with Ford by the UAW-CIO Local at the Rouge Plant bore out the trend established in branch plants, although by not so wide a margin. Final figures have not been disclosed, but it is believed about two-thirds of the Rouge workers voted, and turned down the pension plan by better than 3 to 1. Explanation of the vote on the retirement plan, which had been solidly backed by leaders of the union local, was ascribed to factionalism within the union, resulting in a deliberate distortion of the plan's provisions to many employees, and to a general desire to receive the full industry wage increase pattern of 11½ cents plus 3½ cents in fringe issues. R. T. Leonard, director of the Ford local, says the increase will bring the straight-time average rate to approximately $1.52 per hour, and claims this is 9 cents an hour above the average rate of Ford's largest competitor, (GM), and 7 cents per hour above the latest industry average. Then he adds, threateningly: "Any corporation executive of the auto industry who interprets this decision (defeat of the pension) to mean that auto workers do not desire pension and other social security benefits is sadly and dangerously mistaken."

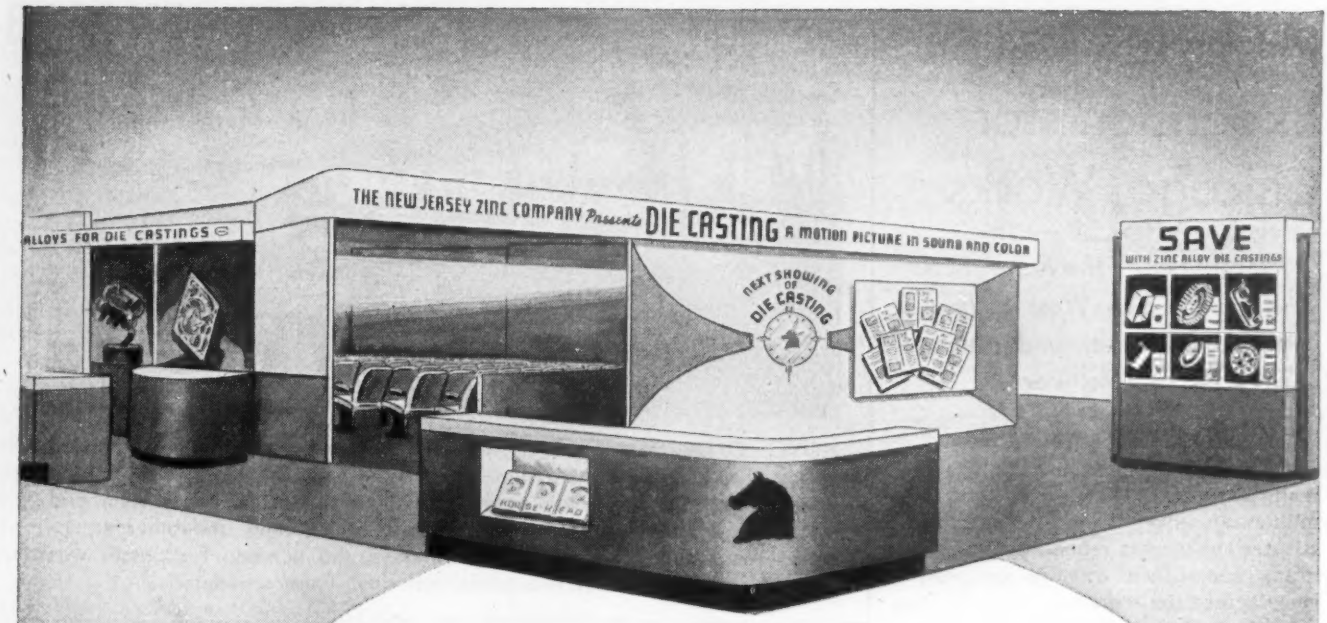
Incentive Offer Rejected

Meanwhile UAW-CIO members at Studebaker summarily rejected the company's offer of an incentive system under which they could have earned a bonus of 20 per cent by stepping up production a specified amount. It was dismissed with the usual "vicious speed-up" charges and allegations.

K-F Raises Sights

Acclaiming the production of 100,000 cars in 15 months, starting from scratch, as unequaled in the industry, Messrs. Kaiser and Frazer drew prolonged cheers from several thousand employees gathered around No. 100,000 as it rolled off the line, the first of a new Kaiser custom line and featuring new interior trim and fittings, with factory list price $2301. Accompanied by his two sons, Edgar F. and Henry Jr., the elder Kaiser told his Willow Run employees he hoped to see production eventually mounting to 2000 per day, with the aid of some new assembly plants which will be built in various sections of the country.

K-F assemblies are now running close to 700 daily, a recent week's count showing over 3400 built and over 3600 shipped. The employees' bonus pool, as posted in the plant, exceeds $470,000. It will build up at the rate of $5 per car, and will be distributed among 7000 production employees of the company early in December.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Plans $5 Million Expansion for Chicago Works

International Harvester Co. will modernize West Pullman plant in largest undertaking since before the war

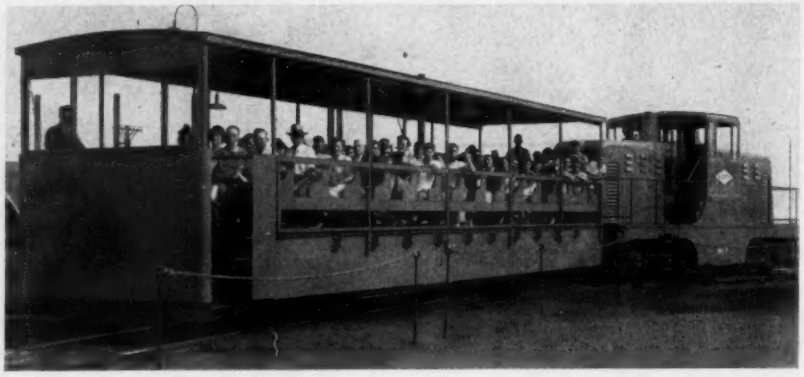
INTERNATIONAL Harvester Co., Chicago, will modernize its West Pullman Works in 1948 at a cost of $5 million, an expenditure for what constitutes the largest rehabilitation program undertaken by the company since before the war.

Present plans call for construction of two manufacturing buildings and a warehouse and the complete renovation of existing facilities, a schedule which is expected to be completed without slowing down operations now at capacity levels. The works, located in Chicago and a unit of the Farm Tractor Division, manufactures a variety of collateral materials used in the assembly of finished products of the company.

As a result of this program, company officials said, one of the oldest manufacturing plants of International Harvester will be converted into an operation capable of handling efficient, modern production for a great many years.

One of the new production buildings will be 81,376 sq ft in area and will house bolt, nut and rivet operations. The second will provide 63,888 sq ft and will house an automatic screw machine operation. The warehouse will have 24,702 sq ft of floor space with overhead cranes and other materials handling equipment. A group of existing connecting buildings will be rehabilitated for use as plant offices for industrial relations, engineering, dispensary and other departments.

Work on the project will probably start before the end of this year and will be completed late in 1948.



NOVEL OPEN HOUSE: Flat cars built up like open trolley cars carried visitors through the plant of the Worth Steel Co., Claymont, Del., during open house. Each car was equipped with a public address system and was screened to permit close approach to rolling mills and other equipment. Originally scheduled for three days, the demand for passes was so large that two additional days were scheduled

Schoedinger Marks 57th Year in Metal Business

F. O. Schoedinger, Columbus, O., manufacturer and distributor of sheet metal products, is celebrating its 57th anniversary this year.

Founded in 1890, the firm is still operated today as an individual proprietorship with Mr. Schoedinger at the helm. The manufacture of stoves and kitchen furnishings marked the beginning of the business which was augmented in 1901 with the distribution of sheet metal. In 1903 Mr. Schoedinger began to produce hospital furniture and later on he added the manufacture of downspouts, gutters and fittings, gas heating stoves and automatic water heaters. Now the firm is also a distributor for tinners', roofers' and furnace men's supplies.

At present the firm's line includes such varied products as furnaces, metal roofing materials, architectural metal work, ventilating equipment, wire hangers, enameled items and hospital beds, cabinets and desks.

Alcoa Launches $100 Million Modernization Program

Aluminum Co. of America, Pittsburgh, is undertaking a $100 million expansion and improvement program in anticipation of a continued upward trend in aluminum consumption.

No addition to basic aluminum capacity is involved, but sheet and fabricating facilities will be increased about 20 per cent. Construction of a sheet and plate mill at Davenport, Iowa, to be ready for operation early in 1948, is the biggest single item in the current project. This plant will cost more than the originally estimated $30 million. With a sheet capacity of 120 million pounds per year, this facility will bring total Alcoa sheet output to 756 million pounds per year.

The new program also includes construction of a die-casting plant at Hillside, Ill., to be ready early in 1948; the expansion of die-casting facilities at the Garwood, N. J., plant; enlargement of facilities which will double the company's foil capacity; $6 million already spent to re-equip the extrusion plant at Cressona, Pa.; and modernization of all other existing plants.

Reveal Rising Accident Rate For Superior Ore District

Although the safety record of the Lake Superior iron ore district still compares favorably with that of other metal-mining sections, co-ordinated efforts by labor and management to check and perhaps reverse a rising accident trend are recommended in a publication released recently by the Bureau of Mines, Department of the Interior, which reviews the 1940-45 accident experience of the nation's chief iron-producing area.

Induction of experienced workers into military service during the 1940-45 period was a principal factor causing the rising accident trend, the publication states.

Mines Bureau Reports on Mineral Exploration Work

Results of exploratory work conducted by the Bureau of Mines on mineral deposits in Wisconsin, Virginia, Wyoming, Arizona and Colorado are described in separate publications recently released by the bureau.

The Wisconsin report concerns zinc deposits in Lafayette county; the publication on Wyoming describes iron deposits in Platte county; the survey on Virginia investigates mineral pyrites in Louisa county. In Arizona and Colorado, the reports cover asbestos, lead-zinc and fluorspar deposits.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Standard Products Co., Detroit, manufacturer of window channels, doorlocks and other automotive products, has taken a 25-year lease on a Cleveland plant at 2100 W. 110th St. Standard's Reid Products Division will occupy the facility.

—o—

United States Steel Supply Co., Chicago, subsidiary of U. S. Steel Corp., announces completion and opening of its St. Louis warehouse at 311 S. Sarah St. The plant, containing about 150,000 sq ft of floor area, was begun last spring.

—o—

Vacuum Cleaner Manufacturers' Association, Cleveland, reports that factory sales of standard-size household vacuum cleaners totaled 2,389,713 at the end of August, which already exceeds the total for all of 1946 and is 43 per cent greater than the figure for 1941, the industry's greatest prewar year.

—o—

Spang-Chalfant Division, Pittsburgh, National Supply Co., maker of oil and gas equipment and tubular products, announces that 361 employees, or about 25 per cent, at its Etna, Pa., plant have service records for 25 or more years.

—o—

War Assets Administration is reoffering for sale or lease a steel foundry in East Chicago, Ind., which Continental Foundry & Machine Co. built and operated for the government during the war. Bids will close Oct. 31. WAA previously rejected a Continental bid for the property of $347,500.

—o—

Hewitt Rubber Division, Buffalo, Hewitt-Robins Inc., manufacturer of rubber products, conveying equipment and other items, has announced the resumption in production of its Maltese Cross fire and chemical hose, withheld from manufacture during the war.

—o—

Robinson Clay Products Co., Akron, producer of vitrified products, refractories, pottery, glass and china, recently honored 89 employees for long service.

—o—

Chicago University, Chicago, announces that Mr. and Mrs. Edward L. Ryerson have given the university $100,000 for basic atomic research. Gift was given in memory of the Ryersons' son, Morton B. Ryerson, who was killed in action during the war. Mr. Ryerson is chairman of Inland Steel Co.

—o—

Ferro Enamel Corp., Cleveland, manufacturer of porcelain enamels, related products and equipment for porcelain and pottery plants, announces opening of a plant in Nashville, Tenn. Facility is now turning out porcelain enamel frit at the rate of 8 million pounds a year.

—o—

Ships & Power Equipment Corp., Barber, N. J., has purchased for $202,400 a U. S. Naval Storehouse at New Windsor, N. Y. Firm plans to use the facility in the manufacture of diesel engines and in ship repairing.

—o—

Adalet Mfg. Co., Cleveland, manufacturer of electrical conduit fittings, has appointed C. C. Pierce Co., Boston, as its factory representative for New England.

—o—

War Assets Administration, Chicago, announces that zone three has launched a program to dispose of more than $90 million worth of auto parts of all kinds. Downward revisions of net costs are provided in new discounts of from 55 to 90 per cent off list prices.

—o—

Ross Heater & Mfg. Co. Inc., Buffalo, division of American Radiator & Standard Sanitary Corp., has appointed Chain Gear Inc., Seattle, as its representative in Washington for the company's line of heat exchangers, coolers, heaters and condensers.

—o—

Metallurgical Products Co., 1199 Beacon St., Brookline, Mass., has been formed by H. I. Dixon as a firm of metallurgical consultants and as a representative for manufacturers of metallurgical products.

—o—

National Board of Fire Underwriters, New York, reports that the cost of fire destruction during the first six months of 1947 exceeded $369 million. This is greater than the total loss for any single full year from 1933 to 1943. Fire Prevention Week has been set for this week, Oct. 5-11.

—o—

United States Steel Corp., Pittsburgh, reports that common stockholders of record on Aug. 9 totaled 168,440, a decrease of 192 since May 9. Corporation preferred stockholders of record Aug. 4 numbered 75,376, an increase of 283 since May 5.

—o—

Whiton Machine Co., New London, Conn., maker of chucks, and gear cutting and centering machines, has appointed Robert E. Morris Co., West Hartford, Conn., as its sales representative for New England and Lloyd & Arms Co., Philadelphia, as its agent for eastern Pennsylvania, southern New Jersey, Delaware, District of Columbia, Maryland and northern Virginia.

—o—

General Electric Co., Schenectady, N. Y., announces that the production of fractional horsepower motors has been boosted to an all-time high, exceeding the 1936-1940 average rate, but in spite of this ac motors rated from 1/6 to 1/3 hp are still in short supply.

—o—

Texas Electric Steel Casting Co., Houston, Tex., has added a flexible type furnace to its equipment in order to produce high alloy steel castings which are in heavier demand as a result of the concentration of the chemicals industry along the Texas gulf coast.

—o—

War Assets Administration, Chicago, announces that Oct. 10 is the date set for disposal of three lots of consumer and producer goods which had an original aggregate cost to the government of over $1 million. Included in the sales are motors, pumps, heat treating furnaces, generators, foundry equipment, wire, cable and other items.

—o—

Sperry Gyroscope Co. Inc., Great Neck, N. Y., manufacturer of gyroscopic and electronic devices, is entering the contract business to balance its shop production. Firm announces that it has a "wide diversification of machine and assembly facilities that can handle complete products."

—o—

Bendix Home Appliances Inc., South Bend, Ind., reports that assembly of its automatic washers will be under way in Mexico during November. This step was taken to overcome the embargo on home appliances placed in effect last July.

—o—

War Assets Administration has sold a jet propellant plant in Azusa, Calif., operated during the war by Aerojet Engineering Corp., to Aerojet Realty Co., a subsidiary of Aerojet Engineering, for $585,000. Plant was originally built as a special purpose manufacturing facility.

The Business Trend

Industrial Activity Hits New Postwar High Mark

OPERATING rates in various basic industries reached a sufficiently high level in the week ended Sept. 27 to set a new postwar high mark. Reflecting this high plane of activity, STEEL's industrial production index registered 166 per cent (preliminary) of the 1936-1939 average. This is two points higher than the previous postwar record of 164 per cent recorded in the weeks ended Mar. 22 and Sept. 20.

The surge needed to push the index to the new high came from the return of the steel ingot production rate to approximately the level that prevailed before a wildcat strike of railroad employees cut steel output at Pittsburgh.

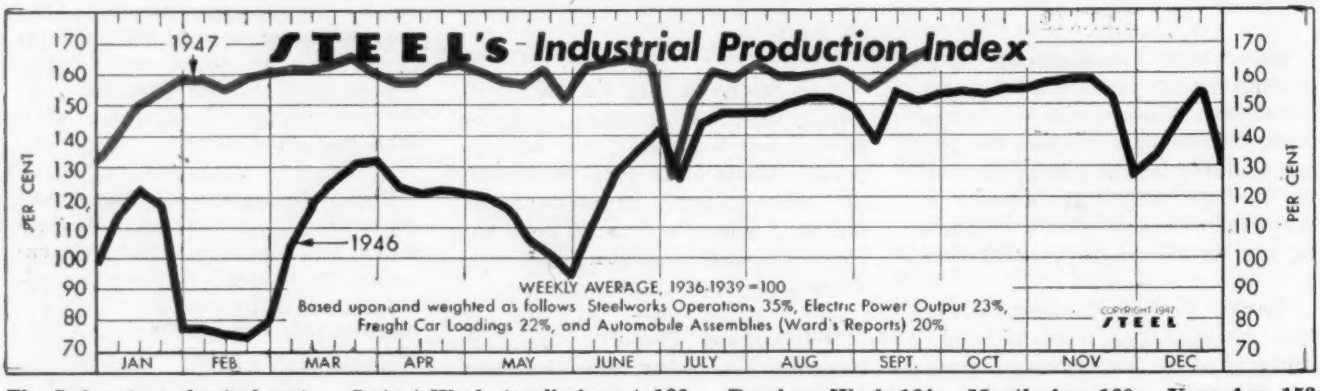
Better business is being reported by a larger number of companies than in any previous month this year, the National Association of Purchasing Agents reports. The increases, says the association, overbalance those reporting declines by 3½ to 1, and increasing confidence is expressed in domestic business for the rest of the year. Although shipments are at high levels, sales are sufficiently high to cause order backlogs to build up in some instances.

AUTOS—Although automobile production declined slightly in the week ended Sept. 27 it still was sufficiently high to lend considerable support to the overall index of industrial activity. Output of passenger cars, trucks and busses that week was estimated at 106,121 units, compared with the postwar record of 109,734 units in the preceding week. Incidentally, production of truck-trailers, which has been declining steadily since January, 1947, fell in July to 2953 units, lowest point since September, 1945.

PRICES—Marking the twelfth consecutive week of new postwar high levels, the Bureau of Labor Statistics wholesale price index rose in the week ended Sept. 20 to 158.1 per cent of the 1926 average. The latest rise, attributed largely to increases for food, put the index to within 5 per cent of the all-time peak of May, 1920.

PRODUCTION—Reflecting improvement principally in the output of minerals and nondurable manufactured goods, the Federal Reserve Board's industrial production index for August rose to 182 per cent of the 1935-1939 average, thereby recovering most of the ground lost in July. The July index was 177 per cent; June, 184. Activity in industries manufacturing durable goods increased somewhat in August but remained 3 per cent below the June level.

EMPLOYMENT—Accompanying the improvement in industrial production in August was a rise in nonagricultural employment to 42,558,000 workers from the July level of 42,139,000. The August level was the highest point reached in 1947. This included a gain in factory employment from 15,170,000 in July to 15,484,000 in August.



The Index (see chart above): Latest Week (preliminary) 166 Previous Week 164 Month Ago 160 Year Ago 153

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	94.0	87.5	93.0	90.5
Electric Power Distributed (million kilowatt hours)	4,956	4,977	4,940	4,518
Bituminous Coal Production (daily av.—1000 tons)	2,039	2,100	1,992	2,104
Petroleum Production (daily av.—1000 bbl.)	5,196	5,200	5,157	4,777
Construction Volume (ENR—Unit $1,000,000)	$135.2	$90.6	$136.9	$84.1
Automobile and Truck Output (Ward's—number units)	106,121	109,734	88,098	85,495

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

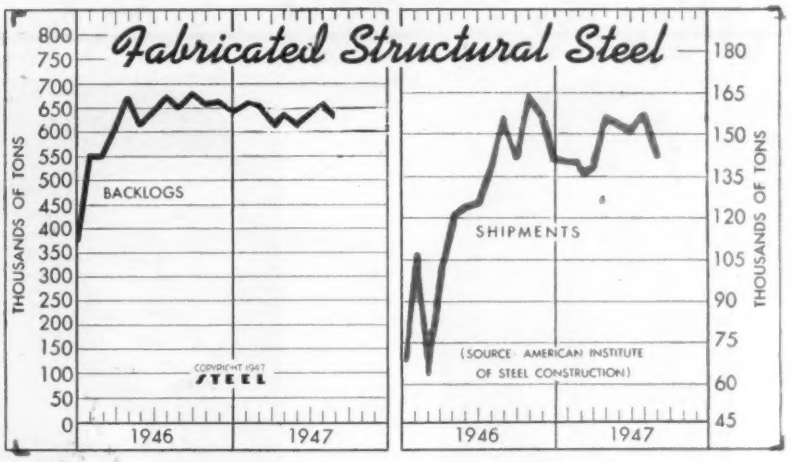
TRADE				
Freight Carloadings (unit—1000 cars)	925†	931	926	916
Business Failures (Dun & Bradstreet, number)	77	73	64	28
Money in Circulation (in millions of dollars)‡	$28,556	$28,633	$28,302	$28,448
Department Store Sales (change from like wk. a yr. ago)‡	+8%	—1%	—3%	+27%

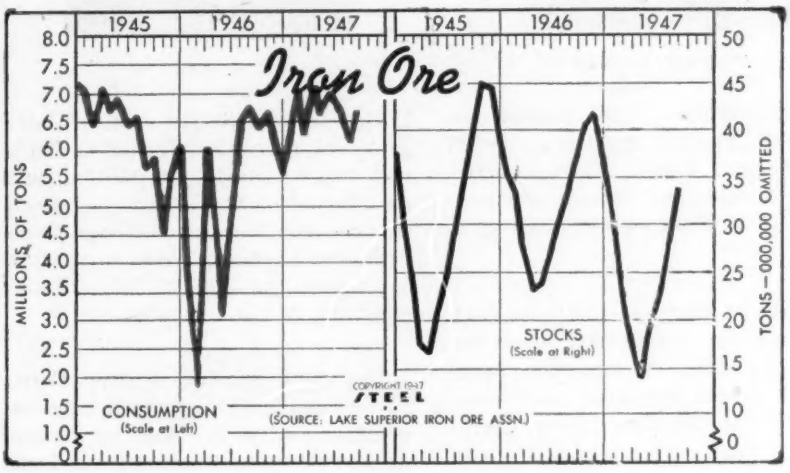
† Preliminary. ‡ Federal Reserve Board.

Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1947	1946	1945	1947	1946	1945
Jan.	140.6	107.5	57.0	661	552	124
Feb.	136.1	63.8	49.0	656	551	152
Mar.	137.8	102.8	59.5	614	605	153
Apr.	157.4	122.5	62.8	632	674	163
May	155.0	124.4	72.6	628	615	166
June	151.9	126.8	69.2	634	642	195
July	156.6	140.2	69.9	661	674	194
Aug.	143.6	157.5	70.6	639	651	201
Sept.	....	141.9	63.4	...	682	248
Oct.	....	164.7	76.6	...	660	283
Nov.	....	157.3	78.0	...	665	305
Dec.	....	142.1	68.8	...	646	375
Total	....	1,551.6	797.4	...	...	...





Iron Ore

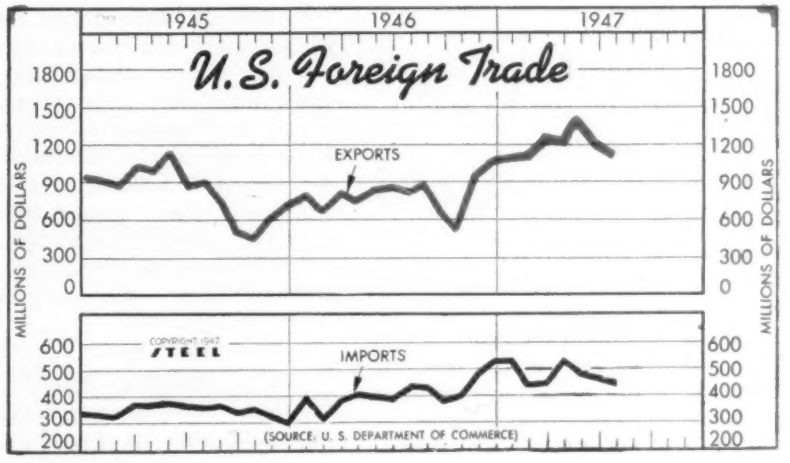
(Lake Superior Iron Ore Assn.)
Gross tons—000 omitted

	Consumption		Stocks at Lake Erie docks and furnaces	
	1947	1946	1947	1946
Jan.	7,024	3,719	30,514	35,342
Feb.	6,264	1,748	24,317	33,647
Mar.	6,979	6,021	17,411	27,601
Apr.	6,579	4,769	13,555	23,079
May	6,885	2,990	17,618	23,905
June	6,500	4,995	21,746	26,265
July	6,156	6,460	28,440	30,439
Aug.	6,638	6,738	33,896	34,067
Sept.	....	6,380	.....	37,573
Oct.	....	6,625	.....	40,435
Nov.	....	6,131	.....	41,919
Dec.	....	5,516	.....	37,465
Total	....	62,093	.....	.....

Foreign Trade

Bureau of Foreign and Domestic Commerce
(Unit Value—$1,000,000)

	Exports			Imports		
	1947	1946	1945	1947	1946	1945
Jan.	1,114	799	903	533	394	334
Feb.	1,151	670	887	435	318	325
Mar.	1,327	815	1,030	444	384	365
Apr.	1,299	757	1,005	512	407	366
May	1,423	851	1,135	474	397	372
June	1,242	878	870	463	386	360
July	1,151	826	893	450	434	356
Aug.	....	883	737	...	426	360
Sept.	....	643	514	...	378	335
Oct.	....	537	455	...	394	344
Nov.	....	987	639	...	481	322
Dec.	....	1,097	736	...	536	297
Total	....	9,743	9,804	...	4,935	4,136



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,980	$13,723	$11,921	$12,425
Federal Gross Debt (billions)	$259.0	$259.0	$260.0	$265.6
Bond Volume, NYSE (millions)	$16.4	$17.7	$13.4	$35.4
Stocks Sales, NYSE (thousands)	3,532	4,180	3,059	8,412
Loans and Investments (billions)†	$64.7	$64.3	$63.6	$59.4
United States Gov't. Obligations Held (millions)†	$39,022	$38,699	$38,527	$40,525

† Member banks, Federal Reserve System.

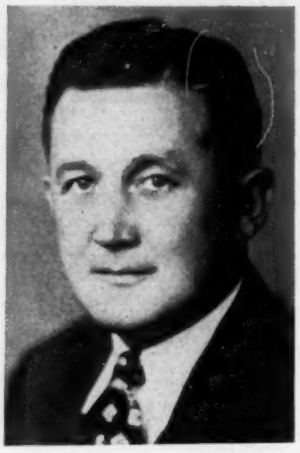
PRICES

STEEL's composite finished steel price average	$75.41	$75.41	$75.41	$64.45
All Commodities†	158.1	157.4	153.5	123.8
Industrial Raw Materials†	173.6	171.9	167.7	142.5
Manufactured Products†	152.7	152.5	148.3	117.1

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

NED A. OCHILTREE



JOSEPH F. MURRAY

J. S. ESKIN

C. Louis Meyer, founder and formerly president of Ceco Steel Products Corp., Chicago, has been named to the position of chairman of the board, and **Ned A. Ochiltree,** formerly executive vice president, has been elected president. Mr. Ochiltree joined the company in 1915, was appointed a vice president in 1927 and executive vice president in 1944.

—o—

B. H. Johns, for the past seven years manager of the St. Louis branch of Independent Pneumatic Tool Co., Chicago, manufacturer of Thor portable power tools, has been appointed manager of the company's Mining & Contractors Tool Sales Division, with headquarters at Chicago. He has been a member of the Thor sales organization for 21 years, and served previously as manager of the Philadelphia branch. **W. B. Smith,** former manager of the Houston, Tex., branch, succeeds Mr. Johns at St. Louis, and **R. F. Caslin,** Thor electric tool service engineer in the Houston territory, has been appointed to succeed Mr. Smith as Houston manager.

—o—

Norman B. Johnson has been appointed to the newly created post of assistant executive vice president of Pullman-Standard Car Mfg. Co., Chicago. Starting with American Car & Foundry Co. at Chicago in 1909, he later joined Haskel & Barker at Michigan City, and in 1935, after Haskel & Barker merged with Pullman interests, Mr. Johnson was assigned to the Chicago plant as liaison officer to the president, and later chief engineer of Pullman-Standard. In 1938 he was made manager of freight car plants of the company.

—o—

Herman L. Cook has been appointed superintendent of the enamel department, Ingersoll Steel Division of Borg-Warner Corp., Chicago. He had been sales and service engineer with the O. Hommel Co., Carnegie, Pa.

—o—

Joseph F. Murray, formerly field supervisor for the tubular sales department, Jones & Laughlin Steel Corp., has been appointed sales manager of the Reading Tube Corp., Reading, Pa.

—o—

Richard M. Barnes has been appointed northeastern sales and service manager for counterflo heaters and crane cab coolers, Dravo Corp., Pittsburgh. His headquarters will be with Emerson-Swan Inc., Boston, and his territory will include New England and the northern part of New York state. He previously had been assistant sales manager, heating section of Dravo Corp.'s Machinery Division in Pittsburgh.

—o—

John A. Roebling's Sons Co., Trenton, N. J., announces appointment of **H. S. Christie** as manager of the Atlanta branch office. He succeeds **C. G. Mullings,** who recently retired after 45 years' service in the Atlanta territory.

—o—

Brad C. Gamble has been promoted from superintendent of industrial relations to assistant to the general superintendent of the Gary sheet and tin mill, Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp., New York. **William P. Jones** has been appointed to succeed Mr. Gamble at this plant.

—o—

W. E. Sprackling, vice president, Anaconda Wire & Cable Co., New York, has been elected executive vice president, succeeding **Harold V. Engh,** who has resigned that position, and as director of the company. **Francis O. Case** has been elected vice president, and **Clyde E. Week,** a director. Mr. Sprackling and Mr. Case are also directors of the company.

—o—

The Colorado Fuel & Iron Corp., Denver and New York, announces appointment of **J. S. Eskin** as general manager of sales, Realock Fence Division. He will maintain headquarters at Buffalo. **L. J. Renner** has been appointed Chicago district sales manager of the Wickwire Spencer Steel Division of the corporation.

—o—

The Clark Controller Co., Cleveland, announces the appointment of **John L. Hutton** as district manager of the Philadelphia area, succeeding **O. L. Holcombe,** who has been made district engineer in that territory.

—o—

Wade Stevenson and **C. Edgar Schabacker Jr.** have been elected directors of Frontier Industries Inc., Buffalo. Mr. Stevenson is president, Eastman Machine Co., Buffalo, and Mr. Schabacker is in the loan and credit department of the Marine Trust Co.

—o—

Square D Co., Detroit, announces formation of a general sales department to co-ordinate sales promotion, advertising and overall sales policies of the company's Electrical Divisions. **L. W. Mercer,** vice president, will serve as general sales manager under the new plan, and also will continue as general manager of the Switch & Panel Division in Detroit. **R. H. Roby** has been appointed assistant general sales manager, responsible

Here's how Speed Nuts really cut costs!

ATTACHING CAGE NUTS

ATTACHING SPEED NUTS

COST REPORT

ITEM: Fastening Rear Fenders To Body

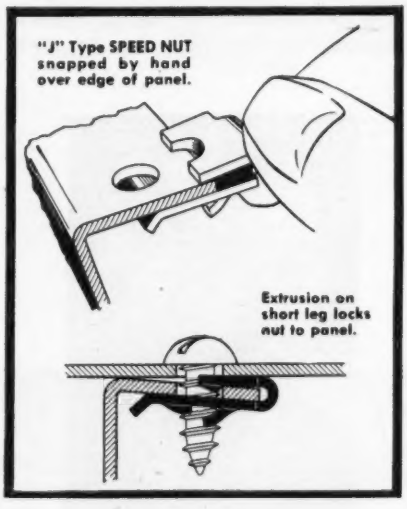
DESCRIPTION	No. per car	Material	Direct Labor	Overhead	Mfg. Cost
Cage Nut (Welding Type)	18	.1512			1512
Bolt (5/16 - 18 x 1)	18	.0918			.0918
Lock Washer	18	.0072			.0072
Plain Washer	18	0234			.0234
Spot weld 9 welding nuts to R & L Wheelhouse Panels			2200	3850	.6050
Assemble R & L Fenders to Body			.1800	.3150	.4950
TOTAL for Welding Nut		.2736	4000	.7000	1.3736
Speed Nut ("J" Type)	18	.1116			.1116
Bolt (5/16 - 10 x 5/8)	18	.0828			.0828
Plain Washer	18	.0234			.0234
Attach 9 Speed Nuts to R & L Wheelhouse Panels			.1100	.1925	.3025
Assemble R & L Fenders to Body			.1350	.2363	.3713
TOTAL for Speed Nut		.2178	.2450	.4288	.8916
SAVINGS		.0558	.1550	.2712	.4820

Proof...that SPEED NUTS slash overhead and handling costs

- LOCK WASHER ELIMINATED
- SPOT WELDING ELIMINATED
- SPEED NUT COSTS LESS
- BOLT COSTS LESS
- LABOR COST IS LESS
- OVERHEAD IS LESS

Total saving for one operation using only 18 SPEED NUTS

Don't miss the SPEED NUT Exhibit at Booth No. 210 NATIONAL METAL CONGRESS



On this one simple operation, a prominent automobile manufacturer saved 48c per car by changing over to the SPEED NUT System of Fastening. Simple mathematics point out the phenomenal savings made possible by widespread use of SPEED NUT brand fasteners.

42c of this total was saved by reducing overhead and handling costs. With SPEED NUTS on the assembly line, welding machines were eliminated. Less floor space needed. Less material handling. Easier final assembly—and ⅓ of the men transferred to more productive work.

Look this report over carefully. Compare those direct labor and overhead charges and then drop us a line and find out for yourself what the SPEED NUT savings factor can do for you.

TINNERMAN PRODUCTS, INC. 2039 Fulton Road, Cleveland 13, Ohio

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S. A., Paris
In Australia: Aerocessories, Pty. Ltd., Melbourne

Speed Nuts*

MORE THAN 4000 SHAPES AND SIZES

PATENTED

* Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

for overall co-ordination of field activity, advertising and sales promotion. For the present he will continue as sales manager, Industrial Controller Division, Milwaukee.

—o—

W. J. McArdel has been appointed vice president and sales manager, Rigid-Tex Corp., Buffalo, producer of rigidized metal and bonded metals. He formerly had been sales manager for the company. **William R. Thompson** has been appointed to head the Pittsburgh district sales for the company.

—o—

Edward J. Hanley, vice president in charge of finances, secretary and treasurer of Allegheny Ludlum Steel Corp., Pittsburgh, has been elected a director of the company. He relinquishes the post of secretary to **Stanley A. McCaskey,** who was previously assistant secretary.

—o—

John W. Kight has been named plant manager, Lawson Mfg. Co., Pittsburgh. He formerly had been vice president of Rotogravure Engineering Co., Everett, Mass.

—o—

Brian E. Brennan has been appointed chief industrial engineer, and **Allen R. Sowle,** master mechanic, of Bendix Home Appliances Inc., South Bend, Ind. Mr. Brennan operated the Brennan Engineering Co., Chicago, before joining Bendix Home Appliances.

—o—

Edwin F. Pierce, rim plant superintendent, Goodyear Tire & Rubber Co., Akron, has accepted an invitation to participate in the twelfth advanced management program sponsored by the graduate school of business administration, Harvard University.

—o—

Sylvania Electric Products Inc., New York, announces enlargement of its commercial engineering department which will now include activities of the company's lighting center in New York. **Don P. Caverly,** director of the center, has been named manager of the expanded department, succeeding **Harris Reinhardt,** who has been appointed assistant to the director of industrial relations. In addition to his new responsibilities, Mr. Caverly will continue to direct activities of the lighting center, and has named **J. C. Kromhout,** architectural engineer, as supervisor. **Jan Reynolds,** also a member of the lighting center staff, has been appointed home lighting consultant. Under the new department set-up, **Charles I. Brady Jr.,** formerly division lighting engineer in New York, has been named supervisor on Lamp Division products and **Robert R. Wylie,** previously commercial engineer at the Danvers, Mass., plant, has been appointed supervisor on Fixture Division products.

—o—

Stephens-Adamson Mfg. Co., conveyor and ball bearing manufacturer of Aurora, Ill., announces the promotion of **A. W. Ostberg,** formerly purchasing agent, to be assistant manager of the Merchandise Division. He will be in charge of the co-ordination of sales and production of the company's line of standard box car loaders, car pullers, winches and speed reducers. **E. K. Race** has been named to succeed Mr. Ostberg as purchasing agent.

—o—

Allan O'Neal, connected with the B. F. Goodrich Co., Akron, since 1929, has been named manager of the company's plant in Clarksville, Tenn. He succeeds **C. R. Spencer,** who has resigned.

—o—

S. B. Murphy has been appointed field engineer in the Pittsburgh district for Nelson Stud Welding Corp., Lorain, O., and its affiliated companies. He had been with the Eutectic Welding Alloys Corp., New York.

—o—

Richard R. Snow, division superintendent of hot mills at the Joliet plant of American Steel & Wire Co., Cleveland, a U. S. Steel Corp. subsidiary, has been appointed general superintendent of the Joliet works to succeed **James Darrow,** who has retired after 52 years' continuous service with this subsidiary.

—o—

International Harvester Co., Chicago, announces the following changes in the Steel Division organization: **W. E. Brewster,** general superintendent, Wisconsin Steel Works, has been appointed manager of operations, Steel Division, with headquarters in the general office. He is succeeded by **R. A. Lindgren,** who has been assistant general superintendent. **F. M. Washburn** has been promoted from superintendent of metallurgy and inspection to assistant general superintendent.

—o—

Edward F. Steinman has been elected chairman of the Alabama Chapter, American Society of Safety Engineers. Other officers are **A. R. Lyons,** vice chairman and **L. A. Corcoran,** secretary.

—o—

Louis W. Rasor has been appointed district sales manager, Mechanical Goods Division at Charlotte, N. C., Goodyear Tire & Rubber Co., Akron. He succeeds **Richard G. Abbott,** who has been transferred as district manager at Los Angeles.

—o—

R. M. Bartlett, Gulf Oil Corp., Pittsburgh, has been elected vice president in charge of oil sales, and **H. P. Hobart,** elected vice president in charge of lubricating oil sales.

—o—

Benjamin S. Thomas has retired as general traffic manager, American Radiator & Standard Sanitary Corp., Pittsburgh.

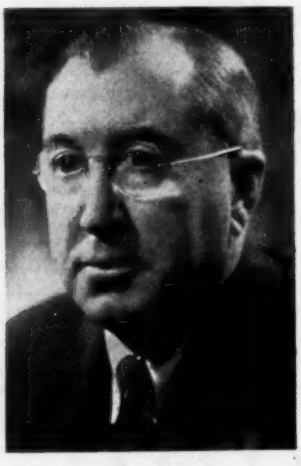
—o—

H. R. Russell has been appointed general sales manager, Tinnerman Products Inc., Cleveland. He formerly had been associated with the Commercial Controls Corp., Rochester, where he served, since 1941, as vice president and general sales manager.

—o—

Robert J. Fisher, supervisor of standards, Falk Corp., Milwaukee, has been elected chairman, for 1947-48, of the job evaluation and time study committee of American Foundrymen's Association. **M. E. Annich,** American Brake Shoe Co., at Mah-

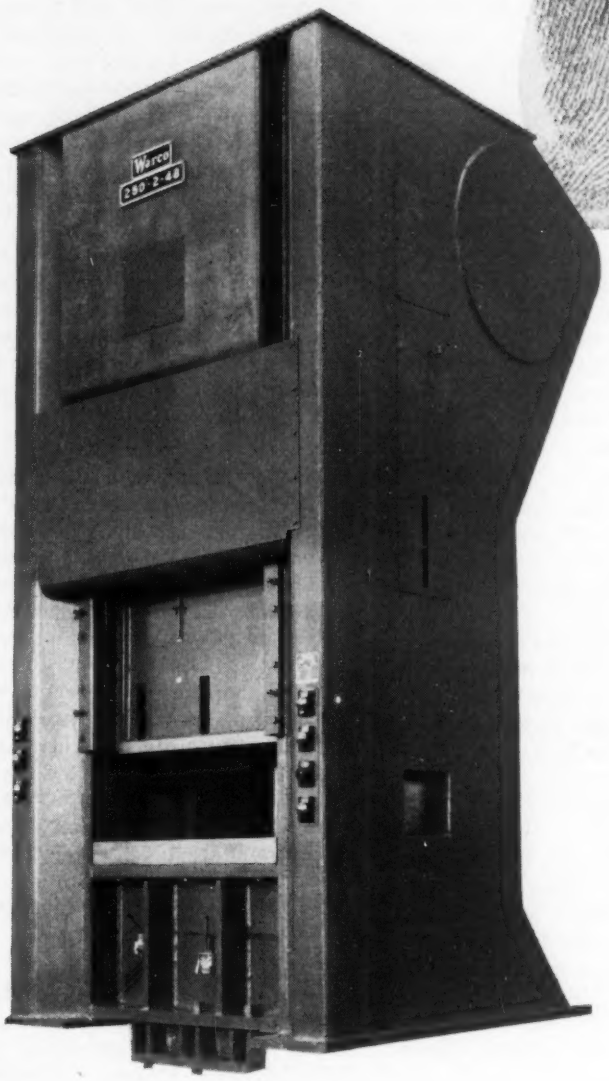
RICHARD R. SNOW



H. R. RUSSELL

POSITIVE
as a fingerprint

Warco PRESSES



WARCO 250-Ton Two Point Eccentric Gear Press. Distance between housings 48 inches. All-welded steel construction. WARCO friction clutch, electrical push button control.

A fingerprint is the most positive means of identification known, and, likewise, the WARCO trademark is equally positive in identifying the finest presses known.

The complete line of WARCO presses — ranging in capacity from 50 tons up — is of *fully stress-relieved all-steel welded construction.* The rigid non-deflecting frames increase life of expensive dies. WARCO close-tolerance specifications reduce vibration, wear and noise.

There is a modern WARCO press for quantity production of all stampings at lower per unit cost.

Our skilled and experienced engineers will be pleased to work with you on your press problems. Write today for further information, or, better still, arrange to visit our modern plant, the largest of its kind in the world.

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4107 GRISWOLD ST., WARREN, OHIO
A Subsidiary of The Federal Machine and Welder Company
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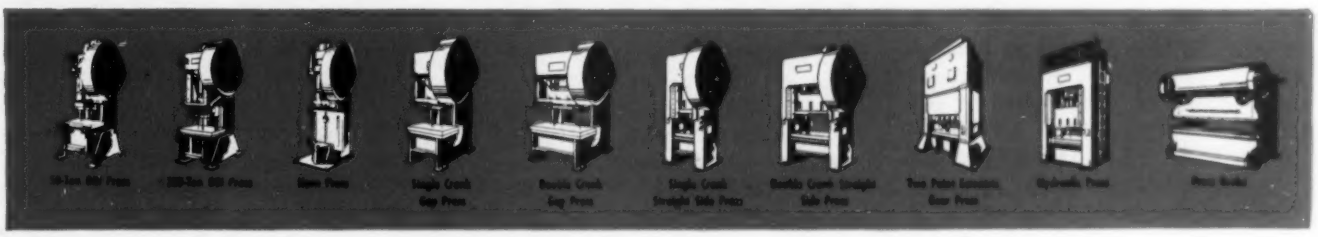


wah, N. J., has been chosen vice chairman of the group, and **E. G. Tetzlaff,** Pelton Steel Casting Co., Milwaukee, named secretary.

—o—

Elbert B. Hamlin has been placed in charge of advertising of Haydon Mfg. Co., Forestville, Conn., maker of timing devices.

—o—

Meade Johnson, marketing manager, Yale & Towne Mfg. Co., Stamford, Conn., has been promoted to general sales manager of the company.

—o—

Robert Heller, president, Robert Heller & Associates Inc., Cleveland, has been elected a director of General Aniline & Film Corp., Binghamton, N. Y.

—o—

Lt. Gen. Ira C. Eaker, who recently retired after thirty years' military service, and formerly deputy commanding general of United States Air Forces, has been elected vice president of the Hughes Tool Co., Houston, Tex.

—o—

Irving H. Welinsky has been appointed research chemist, assigned to general research, for the Research & Development Division of Pittsburgh Consolidation Coal Co., Pittsburgh. **Jack F. Chapin** has been appointed chemical engineer, assigned to operational work on the coal gasification pilot plant of the division, and **William E. Lough,** appointed chemical engineer to be employed on the coal gasification pilot plant.

—o—

The American Society for Metals, Cleveland, has announced that **Charles R. Hook** has been elected to receive the Society's Medal for the Advancement of Research for 1947. Mr. Hook is president, American Rolling Mill Co., Middletown, O. Award of the medal will be made at the annual banquet of the society, to be held in Chicago Oct. 23 during the National Metal Congress and Exposition.

—o—

Jones & Laughlin Steel Corp., Pittsburgh, announces the following personnel changes: **S. S. Marshall Jr.,** a director, member of the executive committee and vice president of the corporation in charge of manufacturing operations, has retired after 44 years' service with the Jones & Laughlin interests. **J. B. Mitchell,** general manager of manufacturing operations, has been elected to succeed Mr. Marshall in the above named positions. **S. K. Miller,** general superintendent of the Aliquippa Works of the corporation, and **H. D. Stark,** assistant general manager of manufacturing operations, have been appointed assistants to the vice president in charge of operations. **H. F. Martin,** assistant general superintendent of the Aliquippa Works, has been appointed general superintendent of the works. **P. H. Devaney,** superintendent of the rolling mills at the Aliquippa Works, has been appointed assistant general superintendent of the Works. **V. H. Lawrence,** a vice president of the corporation, has been elected a director and a member of the executive committee.

—o—

Victor H. Lawrence, vice president, Jones & Laughlin Steel Corp., Pittsburgh, has been elected a director and member of the executive committee. He joined Otis Steel Co. in 1941 as assistant to president, and became general superintendent of the Otis Works when the company merged with Jones & Laughlin Corp. in 1942. He later became vice president of the corporation, and has maintained headquarters in Pittsburgh.

—o—

Schyler Merritt has resigned as a director of the Yale & Towne Mfg. Co., Stamford, Conn., after serving with the company for 70 years.

—o—

William R. Willard has been named director of organization planning for Columbia Steel Co., West Coast subsidiary of U. S. Steel Corp. For the past 10 years he has been administrative staff assistant in the office of the president of Columbia Steel.

—o—

E. C. Atkins & Co., Indianapolis, announces the appointment of **A. L. Martinson** as manager of sales and merchandising for the Hardware Division. He has been supervising the selling of hardware on the West Coast for the company, and had headquarters at the Portland, Oreg., branch office.

—o—

J. Robert Sutherlin has been named assistant sales manager of the Orr Iron Co., Evansville, Ind.

—o—

Lou Colen, Nathan S. Colen & Son Inc., Los Angeles, has been elected vice president of the Southern California chapter of the Institute of Scrap Iron & Steel Inc. to fill the unexpired term of **E. S. Grinstein,** who has resigned.

—o—

E. R. Hinton, associated with the Olympic Steel Works, Seattle, for 30 years, has been elected president to succeed the late **C. W. Kucher,** founder and president. **Ronald E. Kucher,** who succeeded his father as president of the Olympic Foundry Co., also of Seattle, is the new vice president of Olympic Steel.

—o—

R. G. LeTourneau Inc., Peoria, Ill., announces the appointment of **Elmer E. Isgren** as vice president in charge of production. In his new duties, Mr. Isgren will be responsible for all manufacturing operations at the LeTourneau plants in Peoria, Toccoa, Ga., Vicksburg, Miss., and Longview, Tex. He will make his headquarters at Peoria. Mr. Isgren, also a director of the company, has been manager, for the past year, of the Longview plant, where the new Tournadozer, a 4-wheeled, rubber-tired bulldozer has been placed into production.

—o—

A. W. Peterson, formerly Kansas City district sales manager, Hotpoint Inc., Chicago, subsidiary of General Electric Co., has been appointed western manager of utility sales for Hotpoint, and **A. H. Jaeger,** eastern manager of utility sales.

—o—

Dr. John H. Curtiss has been named chief of the recently established National Applied Mathematics Laboratories at the National Bureau of Standards, Washington. **Dr. Churchill Eisenhart** has been appointed head of the statistical engineering laboratory of the National Applied Mathematics Laboratories. **Albert S. Cahn** has been appointed executive officer of the Institute of Numerical Analysis, recently established by the Bureau of Standards. **Dr. Arnold N. Lowan** has been appointed chief of the computation laboratory of the bureau and **E. W. Cannon,** appointed chief of the machine development laboratory at the bureau.

—o—

John H. Keating has been elected vice president in charge of manufacturing of Monarch Aluminum Mfg. Co., Cleveland. **Edward C. Bloomberg** has been elected treasurer. **S. C. Sawyer,** secretary, and **Robert I. Kopper,** assistant secretary of the company. **Raymond Deutsch,** president, and **H. J. Deutsch,** vice president, have been re-elected.

—o—

Ernest R. Hanson has joined the staff of Foster D. Snell Inc., New York, consulting chemists and engineers. He will head up research and development in the field of plastics and rubber.

—o—

William E. Newkirk has retired after 45 years of service with the Roots-Connersville Blower Corp. and the Connersville Blower Co., Conners-

VICTOR SAMSON
Appointed district manager, Lamson & Sessions Co., in Detroit. Noted in STEEL, Sept. 15 issue, p. 86

E. W. KELLER
Appointed director of purchases, Wayne Pump Co., Fort Wayne, Ind. Noted in STEEL, Sept. 29 issue, p. 72

FRANCIS J BILLINGSLEY
Appointed superintendent of methods, Stamford, Conn., Division, Yale & Towne Mfg. Co. Noted in STEEL, Sept. 29 issue, p. 68

ville, Ind. He started as a bookkeeper and paymaster for the latter firm, and at the time of his retirement was treasurer and office manager of the former.

—o—

Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., a division of Joshua Hendy Corp., has announced the appointment of **Paul J. Moore** to the newly created position of director of sales and engineering. He has had former association with General Electric Co., Schenectady, N. Y., Imperial Electric Co., Akron, Star Electric Motor Co., Bloomfield, N. J., and the Flagg Machine Co., Paterson, N. J.

—o—

James W. Davis has been appointed manager of sales, Lapham-Hickey Co., Chicago. Prior to joining the company in 1944 as manager of tubular sales, Mr. Davis had been associated with the Pittsburgh Steel Co. for ten years, and from June, 1942, to January, 1944, had served on the War Production Board in Washington as chief of the Carbon Steel Tubing Division.

—o—

Jack L. Ashby, general sales manager, Iron & Steel Division, Kaiser Co. Inc., at Oakland, Calif., has been appointed vice president and assistant general manager of the firm. He will assume supervision of many of the administrative phases of Kaiser Steel, affording **A. B. Ordway,** vice president and general manager, more time to devote to expansion of the company's facilities for supplying steel to the West.

—o—

Ivan Pochna, Charles A. Koons & Co., New York, is on an extended European business trip, surveying markets in the major European countries concerning steel, machinery, etc., and compiling data on the present status of the steel situation, and plans for the next few years.

—o—

Roy C. Hobson, assistant sales manager, Chicago Works, National Malleable & Steel Castings Co., Cleveland, has been elected assistant to vice president in charge of sales.

—o—

Robert L. Hamilton has been elected president of the Dumore Co., Racine, Wis., succeeding his father, **Louis H. Hamilton,** who has become chairman of the board.

—o—

Thomas W. Krueger has been appointed advertising manager, Duff-Norton Mfg. Co., Pittsburgh. For the past 10 years, with the exception of three years with the Army Air Corps, Mr. Krueger has been associated with Jones & Laughlin Steel Corp., Pittsburgh.

OBITUARIES . . .

John T. Smith, 68, former vice president and general counsel, General Motors Corp., Detroit, died Sept. 27 in San Francisco. Mr. Smith, a New Yorker, was in that city on a business trip. He had retained his place on the GM board, and also held directorships in Ethyl Corp., and Underwood Corp., and had been president of GM Shares Inc., and Argonaut Mining Co. Ltd.

—o—

John M. McComb, 65, a vice president, Crucible Steel Co. of America, New York, died Sept. 22. He was a former president of the Motors & Accessories Manufacturers Association, and a director of the Magnavox Co. Inc., Fort Wayne, Ind.

—o—

Edward Emrick, 80, who retired nine years ago from the Wrought Iron Range Co., St. Louis, after 48 years' association, died of a heart attack recently. He had been salesman, general sales manager, assistant vice president and a member of the board of directors before retiring from the company.

—o—

John R. Henkle, 45, Cincinnati sales representative, Mercury Mfg. Co., Chicago, died Sept. 24 in Cincinnati from injuries received in an automobile accident at Zoar, O. He was the son of O. T. Henkle, secretary-treasurer of the company.

—o—

Lawrence G. Pritz, 59, president and founder of the Ohio Ferro Alloys Corp., Canton, O., died recently. One of the early pioneers in electric furnace steel production, he had been connected with various companies before establishing the Ohio Ferro Alloys Corp. in 1928.

—o—

Edmund H. Titchener, 88, president, E. H. Titchener & Co., Binghamton, N. Y., died Sept. 22.

—o—

William E. Mueller, 59, president and treasurer, Mueller Co., Decatur, Ill., died Sept. 22 in that city. He was also president and treasurer, Columbian Iron Works, Chattanooga, Tenn., and chairman of Mueller Ltd., Sarnia, Ont., both subsidiaries of Mueller Co.

—o—

John C. Couzens, 67, an executive of the Consolidated Shipbuilding Corp., New York, died recently.

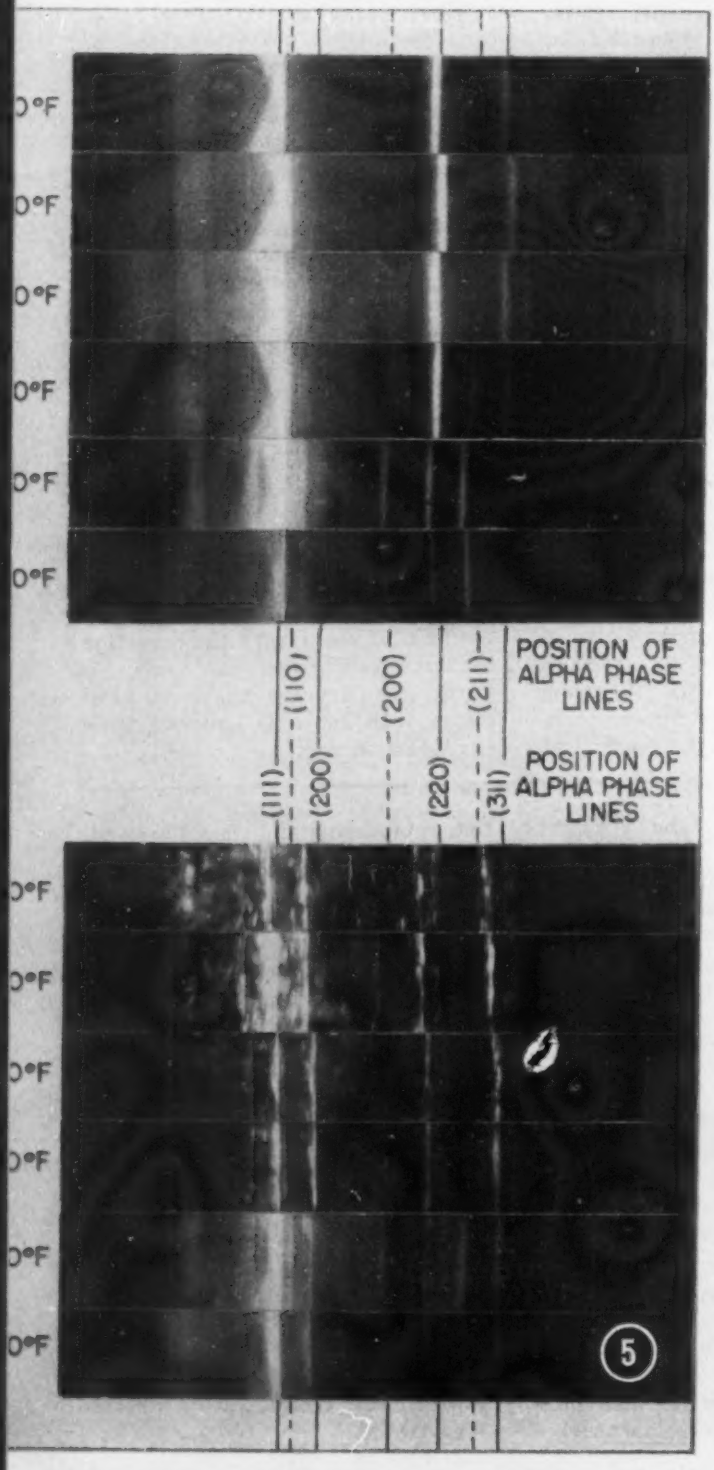
—o—

Charles T. Foster, 60, president, Foster Boiler Works, Milwaukee, died recently.

Effect of Heat Treating and Cold Rolling On Crystal Structure of

AUSTENITIC MANGANESE

The author concludes his review of experimental procedures and appraisal of x-ray diffraction studies on changes within grain structures. Results reported in second and final part of this article indicate that delayed quenching may actually improve the capacity for plastic deformation by cold working



EFFECT of plastic deformation as by cold rolling on Hadfield manganese steel after prolonged tempering in the range 500 to 1100°F was also investigated. Effect of an initial cold rolling prior to the prolonged tempering was given to see whether this would accelerate the transformation.

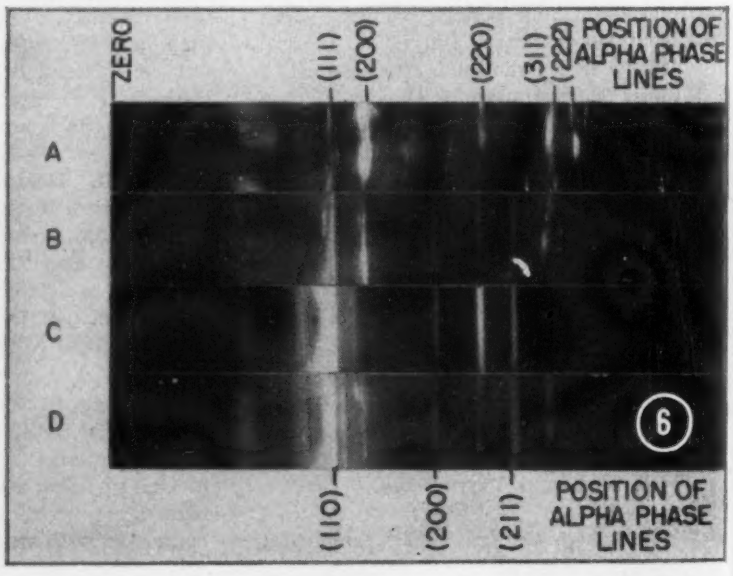
Tables II and III outline the procedure and results obtained. X-ray surface diffraction patterns of these specifications are shown in Figs. 5a and 5b.

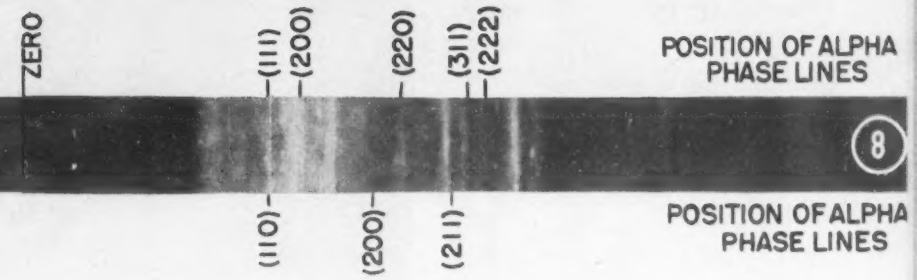
Changes in hardness of the as-quenched hot rolled strip were first detected when the material was heat treated for a prolonged time at 600°F, Table III. Monotron hardness increased from M-21-25 to M-25-28, and the specimen became slightly magnetic. The surface diffraction diagram clearly indicates precipitation of some alpha phase. In addition, one or two lines that cannot be accounted for also appeared.

Further study would be required to establish their identity. These lines are not believed due to a carbide phase, in that Niconoff[6], (p. 7) did not observe

The author wishes to acknowledge assistance of Edward Nelson, research engineer, in compiling material for this article.

By N. P. GOSS
Consulting Physicist
Cleveland





any carbide precipitation below 840°F. These changes in the gamma phase did not impair the capacity for plastic deformation. In fact the material could be cold rolled from 0.118 to 0.020-inch without developing any edge cracks and was very slightly magnetic. Monotron hardness of 76 was attained.

On the other hand the specimen which was cold reduced prior to heat treatment did not exhibit any alpha phase but indicated carbide precipitation, although very slightly. Hardness value may have increased in that average hardness value was somewhat greater after heat treatment. It was nonmagnetic after heat treatment at 600°F, but when cold rolled it became slightly magnetic. Is this due to the alpha phase which may have precipitated or is it due to the carbide which is also magnetic? All carbides of manganese may not be magnetic.

Material heat treated above 800°F could not be cold reduced, see Tables II and III. Cold rolling prior to prolonged tempering did not appear to have any marked effect upon capacity for further plastic deformation, although it may have decreased it slightly.

Now let us examine the x-ray diagrams made of the material tempered at 800°F, Figs. 5a and 5b. Both show considerable alpha phase precipitation and carbide phase as well. The transformed phase in the specimen cold worked prior to tempering is finer and more abundant. Hardness of hot rolled, quenched, and tempered strip increased considerably and must be due to finely dispersed alpha and carbide phases.

Tempering at 900°F greatly increased the amount of alpha phase and carbide phase transformed from the gamma phase. This can be seen by examining the proper pair of x-ray diagrams of Figs. 5a and 5b. At 1000°F structural changes were about the same as at 900°F.

A sample of the quenched hot strip heat treated at 1100°F for 340 hours, substantially converted the gamma phase to the alpha phase. It seems that the maximum transformation of the alpha phase takes place between 900 to 1100°F; the material becoming extremely brittle and strongly magnetic. See x-ray diagrams of the specimens heat treated in this temperature range.

It was observed in some of the x-ray diagrams of the foregoing, that the alpha phase which transformed from the gamma phase consisted of small particles, in fact so small that the diffraction lines broadened. The hardness increase observed in the quenched, tempered material is believed due to smallness of mosaic elements resulting from the phase transformation which effectively impedes slip.

Now the question is: Would the mosaic elements transformed from large grains of austenite be small?

Fig. 5—A—Starting material was hot rolled and annealed strip, cold rolled 0.118 to 0.060-inch B—Starting matrial was hot rolled and annealed strip. Specimens were tempered at temperatures indicated. Molybdenum radiation with zirconium oxide filter and specimens set at 10 degrees to x-ray beam

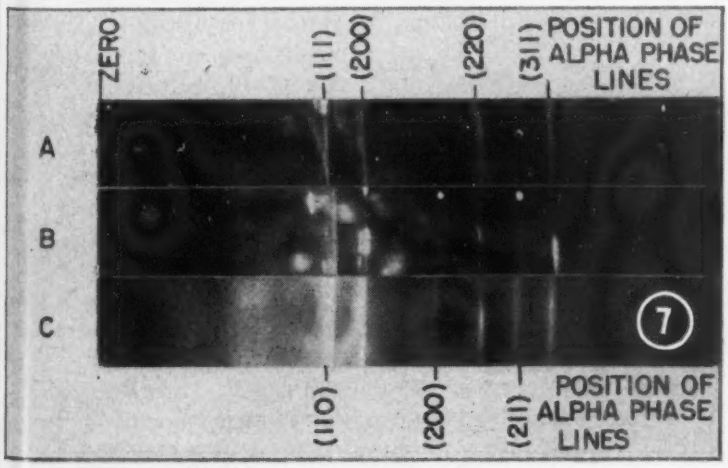


Fig. 6-A—Hot rolled and annealed. Held at 1975° F for 1 hour, cooled to 1700° F in 9 minutes and water quenched. B—Same as A, followed by holding at 1000° F for 24 hours. C—Hot rolled and annealed, cold rolled from 0.118 to 0.050-inch and held at 900° F for 27½ hours. D—Hot rolled and annealed and held at 900° F for 48 hours. Molybdenum radiation with zirconium oxide filter and specimens set at 10 degrees to x-ray beam

Fig.—7-A—Specimen held at 1875° F for 45 minutes, then water quenched. B—Same as A, plus 48 hours at 1100°F. C—Same as B with additional 24 hours at 900°F. Molybdenum radiation with zirconium oxide filter and 10 degree angle of incidence

Fig. 8—Specimen held at 1800°F for 1 minute and air cooled. Molybdenum radiation with zirconium oxide filter and 10 degree angle of incidence

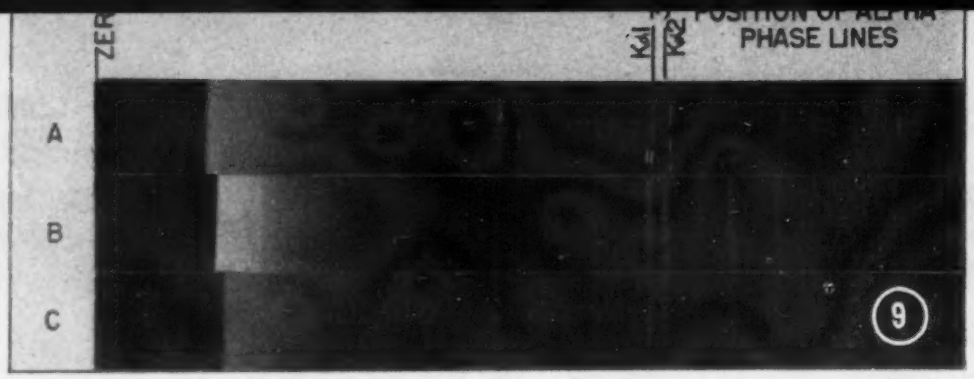


Fig. 9-A—Annealed condition; B—8 per cent reduction; C—15 per cent reduction. Molybdenum radiation with zirconium oxide filter and angle of incidence of 35 degrees

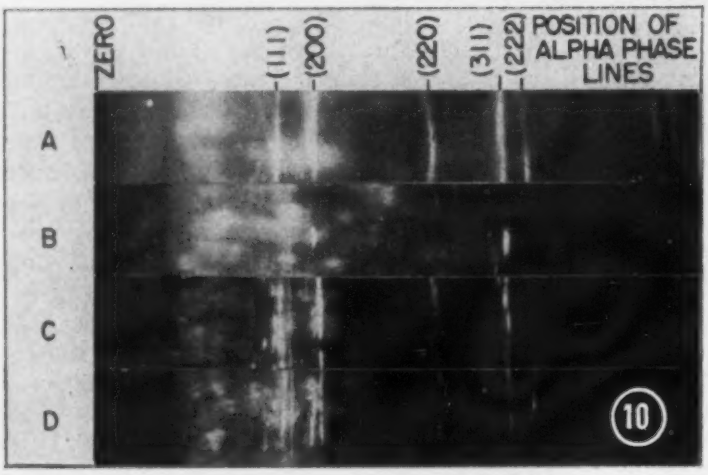
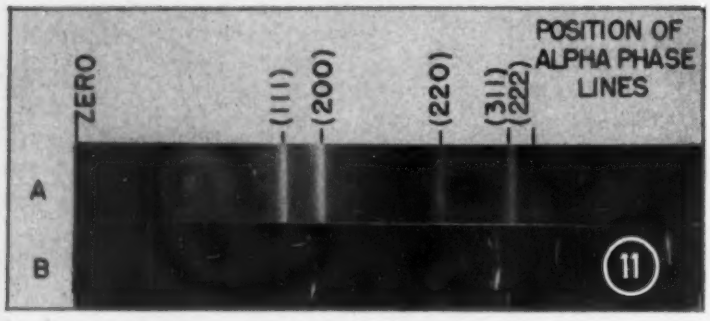


Fig. 10-A—Held at 2200°F for 1 minute and water quenched. B—Same as A with 48 hours at 1100°F. C—Held at 1200°F for 24 hours. D—Held at 1300°F for 28 hours. Molybdenum radiation with zirconium oxide filter and specimen set 10 degrees to x-ray beam

Fig. 11-A—Held at 1850°F for 5 minutes, cooled to 1500°F in 11 minutes, then water quenched. B—Same as A, only air cooled from 1500°F. Molybdenum radiation with zirconium oxide filter and 10 degree angle of incidence.



Accordingly a specimen of hot rolled 0.117-inch strip was held at 1975°F for 1 hour, cooled to 1700°F in 9 minutes and water quenched. The x-ray diagram after this processing is shown in Fig. 6a. Structure is essentially gamma phase and very large grained. These grains are not perfect by any means. The mosaic elements composing the grains are dislocated slightly relative to each other; this is what gives the diffraction spots the blurred appearance.

This specimen was next heat treated at 1000°F for 24 hours. Another x-ray diagram was made, and the structural changes accompanying this heat treatment are easily seen in Fig. 6b. The new lines due to the transformed alpha phase are marked. They are faint and broad. This means that only a small amount transformed and consisted of very small particles (agglomeration of mosaic elements).

As a matter of comparison one can notice that in Fig. 5 showing the material cold rolled 0.118-inch to 0.060-inch and then tempered at 900°F for 24 hours, a much greater alpha phase transformation has taken place. Compare Fig. 5a with Fig. 6b (at 900 and 1000°F). Cold rolling prior to tempering assists in accelerating the transformation, that is the smaller the grain size of the gamma phase, the greater the transformation of the alpha phase at certain temperatures. This is to be expected in that plastically deformed material has more (*Please turn to Page* 132)

TABLE II

Tempering Temp.	Time	Monotron	Effect on Plastic Def.	Structure
500°F	48 Hr	62-68	cold rolled 0.060"—0.30" (M-71-74)	gamma
600°F	24 Hr	63-67	cold rolled 0.060"—0.043", slightly mag. M-75	gamma
700°F	24 Hr	62-74	could be C.R. to some extent	gamma plus carbide
800°F	30 Hr	64-68	could not be cold rolled	gamma plus carbide
900°F	30 Hr	62-72	brittle, could not be cold rolled	alpha, gamma, carbide
1000°F	24 Hr	53-57	brittle, could not be cold rolled	alpha, gamma, carbide

NOTE: Starting material is hot rolled and annealed strip cold rolled from 0.118" to 0.060", hardness 65-70.

TABLE III

Tempering Temp.	Time	Monotron	Effect on Plastic Def.	Structure
500°F	26 Hr	23-25	could be cold rolled	gamma (alpha ?)
600°F	24 Hr	25-28	could be cold rolled	gamma, alpha, carbide
700°F	55 Hr	29-33	could be cold rolled	gamma, alpha, carbide slightly magnetic
800°F	27 Hr	37-42	brittle, could not be cold rolled	alpha, gamma, carbide magnetic
900°F	48 Hr	42-47	brittle, could not be cold rolled	alpha, gamma, carbide very magnetic
1100°F	340 Hr		brittle, could not be cold rolled	alpha, some gamma

NOTE: Starting material is hot rolled and annealed strip, size 0.118". Essentially gamma phase and non-magnetic.

DOLLE ON DEVELOPMENT: During the Machine Tool Show, William L. Dolle, president, Lodge & Shipley Machine Tool Co., Cincinnati, issued an interesting statement as to how progress is stimulated within the machine tool industry. As director and chairman of the Public Relations Committee of the National Machine Tool Builders' Association, his words carry a lot of weight.

"In most industries," said Mr. Dolle, "companies within the industry compete with each other. In the machine tool industry, however, each company must compete not only with others making the same types of machine tools but also with its own former models of machine tools.

"A machine tool does not wear out in the usual sense of the word. Properly cared for and given the work for which it was designed it may continue to operate reasonably well for 20 or 30 years.

"Consequently, in order to stay in business, a machine tool company must—within a reasonable length of time—bring out new models that are so much better than its last previous models that its customers will discard the older models in favor of the new—even though the older models are not 'worn out' in the physical sense.

"In short, obsolescence rather than depreciation, is the governing factor in the machine tool field. General surveys indicate that by and large the industry obsoletes its older models on the average of every seven years.

"This is interesting from the 'social significance' angle. It means that a machine tool company can survive, can stay in business, can make money, only insofar as it *constantly* helps the machine tool user to make better goods for more people—at lower cost."

ONLY THE BEGINNING: Like the "commencement exercises" which marked the termination of our school lives and the beginning of our working lives, the big Machine Tool Show in Chicago is much more important as the beginning of a new era than as the ending of an old era.

Much has been said and much has been written about the tremendous cost of that show in time, in mental and physical effort and in money. Unquestionably that cost, in terms of money alone, runs into the millions. It will cost at least a million dollars merely to get the machines out of the Dodge-Chicago plant and onto the freight cars. Who will "cash in" on this huge investment—and how?

There seem to be two schools of thought on this. One school—and that is the minority—holds that the cost of the show can be considered as that of a powerful blast which immediately will set free a flood of business which will continue to flow in for an indefinite period. Those who subscribe to that school of thought expect to get a generous share of that business with little or no further effort—as a reward for participation in the show.

The other school of thought—and this represents the majority—holds that the show merely is a costly but extremely solid foundation for the erection of a new and far more elaborate marketing structure for the machine tool and tool engineering industries. Just as the show itself is only the foundation of this structure, so also is the cost of this structure—the entire cost of which, including that of the show, will be spread over a considerable period of years as far as the bookkeeping is concerned.

Those who hold to this latter school of thought believe that the long-term "follow-up" on the show is far more important than the show itself. They know that the show stimulated the interest of buyers and prospects, but they also realize that it stimulated competition. Just as the buying public got a taste for new model machines and tools at the show, so also did the buying public get a taste of extra high grade sales engineering attention at the show.

Any let down from now on in the intensity and in the quality of the sales promotion and sales engineering below the levels established during the show is almost sure to be reflected in the returns on investments made in the show. The new era in industrial marketing inspired by the show bids fair to be fully as interesting and fully as important to our national economy as is the new era in industrial production which it will parallel.

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

HENRY MARX NEARS NINETY: One of the most remarkable men of the machine tool industry with whom I renewed old acquaintance during the Machine Tool Show was Henry Marx, president, G. A. Gray Co., Cincinnati.

In the midst of a group of powerful planers whose cutting strokes were much faster than the old-time return strokes and whose return strokes literally were "quick-as-a-flash", I had a most interesting visit with the man who unquestionably is the "dean-of-deans" of the machine tool industry and also one of the oldest living graduates of Cornell University.

Henry Marx admits that he will be 90 on his next birthday. His honorable reputation forces us to believe that that must be true, but there certainly is nothing else to indicate his age. At a time when men one-fourth his age were beginning to bend under the pressure of the show, Henry Marx stood erect, keen, full of energy, greeting all comers to the exhibit of his company. His company, his industry, his university and his city all have good reason to be proud of Henry Marx.

Preview of the 29th NATIONAL METAL CONGRESS

FOR seven days, beginning Sat., Oct. 18, the eyes of the technical world of metals will be focused on Chicago's International Amphitheatre, scene of the 29th annual National Metal Congress and Exposition. During that period over 350 companies and organizations will display and operate metal working equipment and products. Exhibits will occupy all available floor space on both levels of the amphitheatre, an area of about 240,000 square feet.

The 1947 National Metal Congress will again combine technical sessions of the American Society of Metals, American Welding Society, Iron and Steel and the Institute of Metals Divisions of the American Institute of Mining and Metallurgical Engineers, and of the American Industrial Radium and X-Ray Society.

According to W. H. Eisenman, managing director of the Exposition and national secretary of ASM, sponsors of the event, early opening of the huge show is planned to accommodate the unusually large number of engineers and technical people from the Chicago area before the influx of out-of-town visitors, Mon., Oct., 20. Approximately 20,000 persons from outside the Chicago area are expected to attend. Attendance on the two opening days will be by invitation only.

During the opening days, ASM, in co-operation with Case Institute of Technology, Cleveland, will present a seminar on "Fundamental Relations in the Fracture of Metals." It will consist of six panel discussion meetings to be held at the Palmer House, Sat. and Sun., Oct. 18 and 19. Twenty-one leaders in this specialized field are expected to participate.

In an effort to concentrate its program within manageable proportions, the ASM is limiting the number of technical papers to be presented this year. Only 30 will be given. On one day (Tuesday) two meetings will be in session simultaneously. Thus, visitors will have a better opportunity to hear all of the papers in which they may be interested. Morning sessions of the ASM program will be held in the Palmer House with afternoon sessions and meetings at the International Amphitheatre.

Heat treating accounts for a large portion of the subject matter of these sessions, ranging from theoretical studies of phase transformation to practical applications of induction hardening. High temperature alloys and properties of metals at both high and low temperatures, steelmaking problems light metals and other nonferrous alloys, metalworking and testing also come in for attention.

Regular sessions of the ASM program will be supplemented by a meeting on "Metallurgical Requirements of the Atomic Energy and Power Production Program." Participants in this discussion will be leading scientists on the staff of the U. S. Atomic Energy Commission.

"Introductory Physical Metallurgy" and "Copper and Copper Alloys" are subjects of two special lecture courses to be included in the program. C. W. Mason of Cornell University will present four lectures on the first topic while O. W. Ellis of Ontario Research Foundation will deliver three lectures on the second one. All lectures will be held in a meeting room of the Saddle and Sirloin Club of the International Amphitheatre.

Annual meeting of the American Society for Metals will be held on Wed. Oct. 22. Following installation of new officers for 1948 and presentation of annual reports, the Campbell Memorial Lecture will be delivered by Dr. A. B. Kinzel, vice president, Electro Metallurgical Co. The society's annual banquet will be held on Thursday evening at the Palmer House, and will be featured by the award of ASM medals and honors. Those to be honored include: Charles R. Hook, president, American Rolling Mill Co., winner, ASM medal for Advancement of Research; F. P. Zimmerli, chief engineer, Barnes - Gibson - Raymond Division, Associated Spring Corp., recepient, ASM Al-

CHARLES R. HOOK
President, American Rolling Mill Co., recipient of ASM Medal for Advancement of Research

STEEL here presents events to take place at Chicago during the National Metal Congress and Exposition, sponsored by American Society for Metals, Oct. 18 through 24. Exposition and technical sessions of four major societies participating are expected to draw more than 20,000 persons outside Chicago area. Well over 350 manufacturers will display products and methods covering every phase of metalworking

and EXPOSITION

bert Sauveur Achievement Award; C. H. Mathewson, Yale University, winner, ASM Gold Medal; and W. A. Pennington, chief chemist and metallurgist, Carrier Corp., and Henry Marion Howe awardee. Dr. Robert F. Bacher, one of the five members of the U. S. Atomic Energy Commission will be the principal speaker.

During its 28th annual meeting American Welding Society will present a total of 70 papers covering 16 classifications of welding application and research. Papers will be given during 20 technical sessions.

Highlights of the 6-day meeting will be President L. W. Delhi's reception on Sunday evening. Oct. 19; the Adams lecture by G. S. Mikhalapov and the award of prizes and medals on Monday evening of the Congress; the University research conference on Tuesday evening; the section meeting on Wednesday evening and the annual banquet on Thursday.

Supplementing the AWS technical sessions and meetings on welding, a large segment of the National Metal Exposition will be devoted to the exhibits of welding and cutting equipment and supplies.

Fall meeting technical sessions of the Metals Divisions of the AIME will occupy 3 days during the Congress—Mon., Tues. and Wed., Oct., 20 through 22. Headquarters will be at the Stevens Hotel. Registration will begin at 8:30 a.m. on Monday and at 9 a.m. on Tuesday and Wednesday.

The Institute of Metals Division of AIME will open its proceedings with a session on "Copper and Copper Alloys" on Monday morning. First meeting of the division will be held Monday afternoon. The joint meetings of the two divisions are scheduled for Tuesday and Wednesday afternoons. The annual dinner of the Metals Division will be held at the Stevens Hotel Tuesday evening.

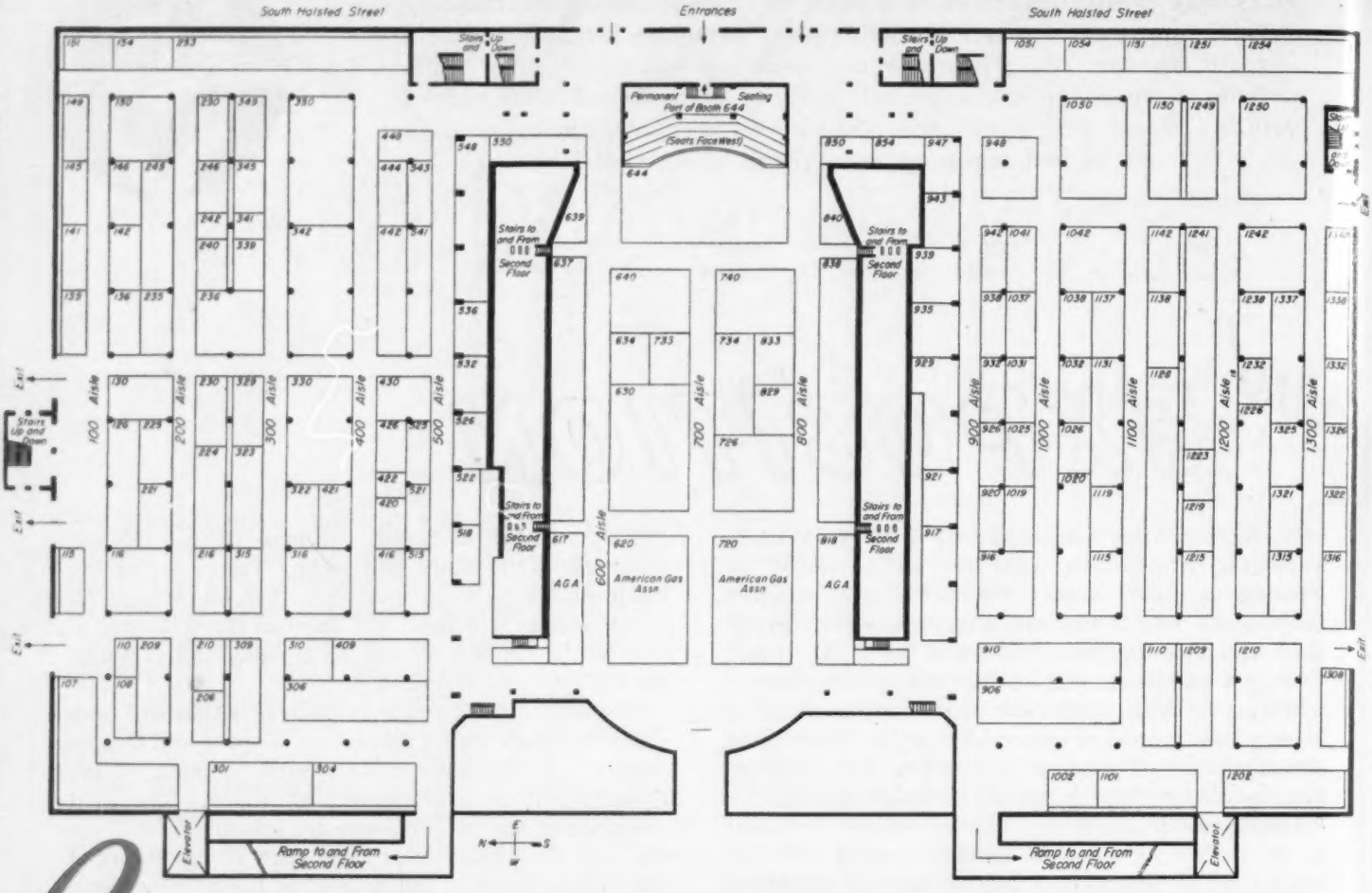
Seventh annual meeting of the American Industrial Radium and X-Ray Society will open with a technical session on Wednesday morning, Oct. 22. Four more sessions will be held on Wednesday afternoon, Thursday morning and Friday morning and afternoon. On Thursday at 2 p.m., members and guests will convene for the important Lester (*Please turn to Page* 130)

A. B. KINZEL
Vice president, Electro Metallurgical Co., Campbell Memorial lecturer, recipient, Miller Medal, AWS

DR. C. H. MATHEWSON
Prof. of Metallurgy, Yale University, 1947 Gold Medal Winner, ASM

W. A. PENNINGTON
Chief Chemist & Metallurgist, Carrier Corp.; Winner of ASM 1947 Henry Marion Howe Medal

F. P. ZIMMERLI
Chief Engineer, Barnes-Gibson-Raymond Div., Associated Spring Corp., Winner of 1947 Albert Sauveur Achievement Award, ASM

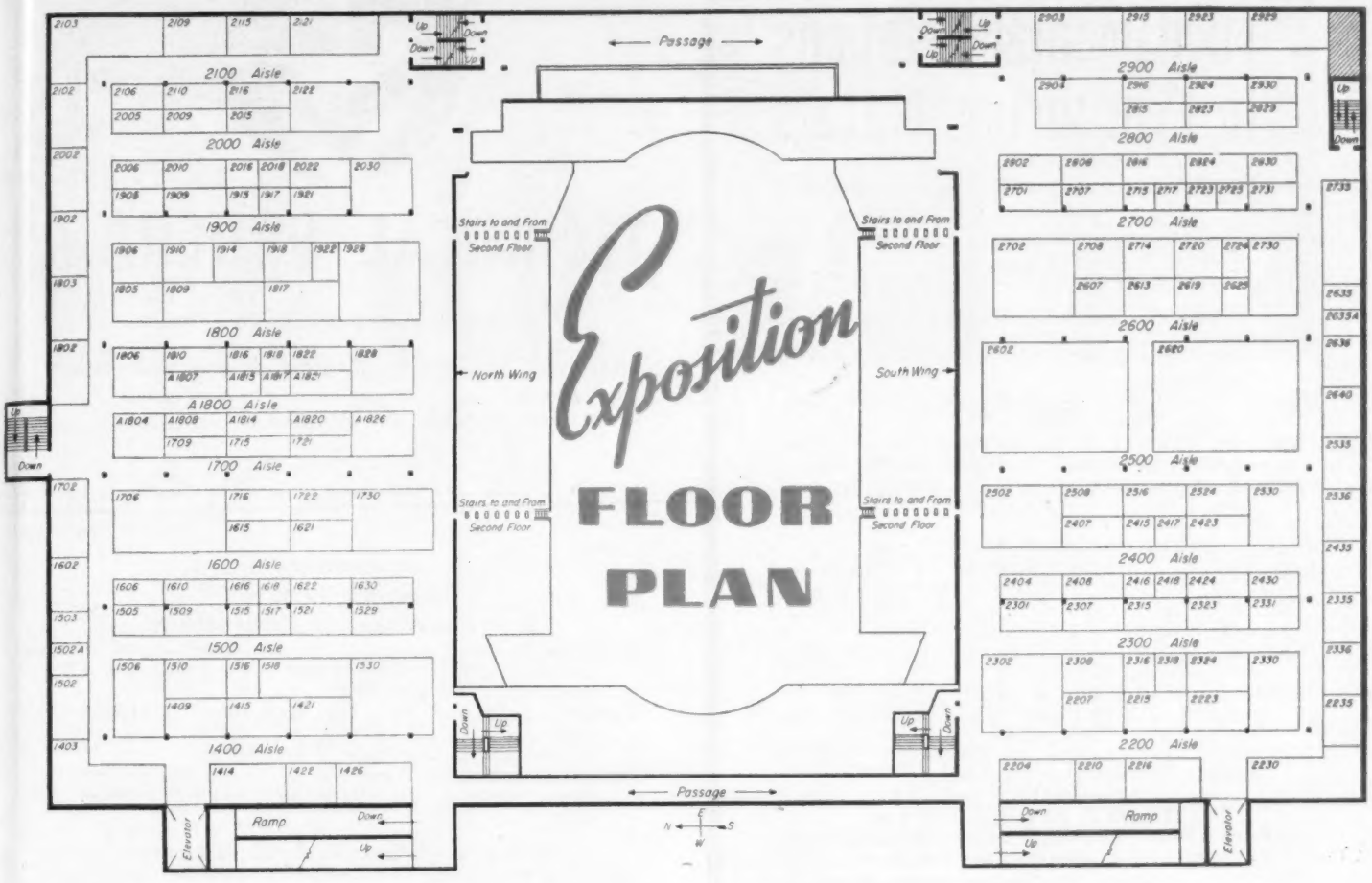


Exhibitors

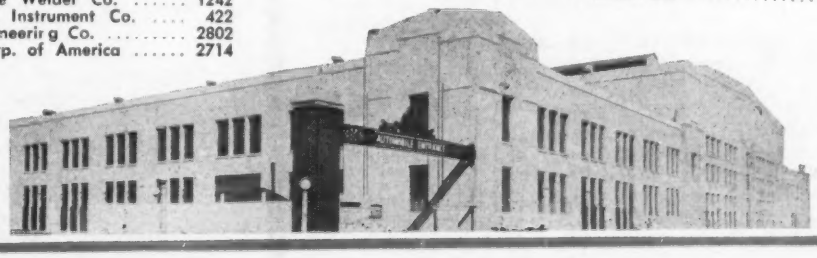
At the National Metal Exposition, International Amphitheatre, Chicago

Exposition opens at noon on Oct. 18, and for the first 5 days will close nightly at 10:30 p. m. On Thursday and Friday, exhibits will be open at 10 a. m., and close at 6 p. m.

COMPANY	Space No.
Acme Aluminum Foundry Co.	2301
Acme Mfg. Co.	2423
Acme Steel Co.	2424
Advance Aluminum Castings Corp.	2210
Air Reduction Sales Co.	330
Ajax Electric Co. Inc.	1054
Ajax Electrothermic Corp.	1151
Ajax Engineering Corp.	1051
Allegheny Ludlum Steel Corp.	216
Allison Co.	1110
Alloy Casting Corp.	246
Alloy Rods Co.	1813
Alox Corp.	141
Aluminum Co. of America	630
Alvey Ferguson Co.	1037
Ameraco Industrial Specialties	2425
American Brakblok Division	342
American Brake Shoe Co.	342
American Brass Co.	939
American Chain & Cable Co.	1110
American Cyanamid Co.	850
American Emblem Co. Inc.	1521
American Forge Division	342
American Gas Association 617, 620, 720,	818
American Manganese Steel Div.	342
American Metal Market	1915
Anchor Drawn Steel Co.	309
American Wheelabrator Corp.	910
Ampco Metal Co.	110
Applied Research Lab.	2516
Arcos Corp.	1515
Arwood Precision Casting Corp.	932
Aurora Metal Co	2009
Automatic Bending Co.	1915
Austenal Laboratories Inc.	149
Automotive Industries	2608
Automatic Transportation Co.	740
Baker & Co., Inc.	1505
Baldwin Locomotive Works	1042
Bastian Blessing Co.	108
Bausch & Lomb Optical Co.	1422
Behr-Manning Co.	1711
Bell & Gossett Co.	421
Blakeslee & Co., G. S.	1338
Bradley Washfountain Co.	2707
Braeburn Alloy Steel Corp.	1032
Brake Shoe & Castings Division	342
Brickseal Refractory Co.	1917
Bridgeport Brass Co.	1251
Bristol Co.	339
Brown Instrument Co.	1138
Bryant Heater Co.	710
Budd Co., Induction Heating Div.	935
Buehler, Ltd.	1615
Burdett Mfg. Co.	1426
Cambridge Wire Cloth Co.	2640
Carboloy Co., Inc.	1142
Central Scientific Co.	1509
Champion Rivet Co.	2708
Chayes Dental Inst. Corp.	2416
Cherry Rivet Co.	1223
Chicago Steel Foundry	310
Cincinnati Milling Machine Co.	2702
Cities Service Oil Co.	230
Clark Instrument Inc.	1816
Cleveland Crane & Engr. Co.	1210
Climax Molybdenum Co.	2102
Clinton Machine Co. Inc.	2725
Colonial Steel Division	309
Columbia Tool Steel Co.	1119
Commonwealth Edison	2002
Continental Ind. Engrs. Inc.	521
Crown Rheostat & Supply Co.	224
Crucible Steel Co. of America	1131
Culen-Friestedt Co.	A-1820
Dearborn Industrial Mfg. Co.	2005
Delaware Tool Steel Corp.	1026
Detrex Corp.	2216
Detroit Electric Furnace	2916
Detroit Testing Machine Co.	1610
Dietert Co., Harry W.	1019
Diamond Machine Tool Co.	225
Dillon & Co. Inc., W. C.	943
Distillation Products Inc.	A-1826
Diversey Corp.	221
Division Lead Co.	A-2635
DoAll Midwest Co.	2315
Dreis & Krump Mfg. Co.	1246
Driver Co., Wilbur B.	235
Eastman Kodak Co.	1226
Ecco Hi Frequency Corp.	921
Electric Furnace Co.	833
Electro-Alloys Division	342
Electro Refractories & Alloys	240
Engineered Castings Division	342
Eutectic Welding Alloys Corp.	548
Executone Inc.	2815
Fahralloy Co.	2408
Fansteel Metallurgical Corp.	2115
Fast Feed Machine Corp. of Ohio	1906
Ferro Bronze Corp.	1822
Finnell System, Inc.	2924
The Foundry	209
Foxboro Co.	926
Frontier Bronze Corp.	1115
Gaertner Scientific Corp.	1517
Gas Appliance Service Co.	620
General Alloys Co.	640
General Electric Co.	1128
Gerity-Mich. Die Casting Co.	1606
Gerrard & Co., A. J.	2006
Globe Imperial Co.	2110
Goodrich Co., B. F.	1315
Gordon, Claud S.	525
Gordon Electronics	1250
Green Electric Co., W.	349
Greenlee Foundry Co.	2830
Grobet File Co. of America	2724
H & H Research Co.	115
Hammond Machinery Builders	142
Handy & Harman	150
Hardy Inc., Charles	1618
Harnischfeger Corp.	1202
Harper Co., H. M.	1910
Hauck Mfg. Co.	1002
Hevi-Duty Electric Co.	135
Hitchcock Publishing Co.	2723
Hobart Bros. Co.	906
Holcroft & Co.	1031
Holden Co., A. F.	550
Horan-Crane Corp.	2331
Houghton & Co., E. F.	948
Huppert Co., K. H.	2731
Hydraulic Press Mfg. Co.	522
Illinois Testing Lab. Inc.	920
Industrial Bulletin	1503
Industrial Publishing Co.	639
Industrial Tape Corp.	942
International Nickel Co.	637
Iron Age	245
Jackson Products	1909
Janney Cylinder Co.	154
Jensen Specialties	1806
Jones & Laughlin Steel Corp.	442
Jones Co., G. Walker	2823
Joslyn Mfg. & Supply Co.	236
Kelley-Koett Mfg. Co.	1515
Kennametal Inc.	2613
Kerr Mfg. Co.	2625
Kewaunee Mfg. Co.	1709



COMPANY	Space No.
King, Andrew	1232
Kloster Steel Corp.	1238
Knu-Vise Inc.	2015
Koch Sons Inc., Geo.	2816
Krieg Co., Charles W.	1529
Krouse Testing Machine Co.	526
Kux Machine Co.	1209
LaSalle Steel Co.	2508
Lead Industries Association	1602
Leeds & Northrup Co.	1101
Lepel High Frequency Lab. Inc.	929
Lester Phoenix Inc.	1316
L'Hommedieu & Sons, Chas. F.	250
Lincoln Electric Co.	734
Lindberg Engineering Co.	726
Lindberg Steel Testing Co.	1038
Liquid Carbonic Corp.	2417
Lithium Co.	715
Los Angeles Chamber of Commerce	2016
McGraw-Hill Publishing Co.	1715
McKay Co.	2636
Machine Design	209
Machinery (Industrial Press)	444
Machinery & Welder Corp.	1137
Magnaflux Corp.	541
Magnesium Association	341
Magnetic Analysis Corp.	1308
Mallory & Co., P. R.	2701
Mandersche'd Co.	146
Manhattan Rubber Div.	1215
Martindale Electric Co.	1516
Metal Finishing Service	2530
Metal Industry Publishing Co.	2715
Metal & Thermit Corp.	316
Metal Working Equipment	2418
Metals & Controls Corp.	1817
Metallizing Co. of America	2336
Michiana Products Corp.	2720
Mid States Equipment Corp.	2536
Midvale Co.	319
Midwestern Sales Corp.	1905
Milburn Co.	2717
Miller Motor Co.	2740
Milne Co., A.	2106
Mine Safety Appliances Co.	1616
Miskella Infra Red Co.	2415
Modern Metals	2635
Molybdenum Corp. of America	733
Monarch Steel Co.	1150
National Bearing Division	342
National Cylinder Gas Co.	107
National Diamond Hone & Wheel	1814
National Engineering Co.	2307
Nat'l Industrial Publishing Co.	2829
National Industrial Laundrerers & Cleaners Association	2524
National Research Corp.	2018
Nat'l Time & Signal Corp.	2435
Nelson Sales Corp.	322
New Equipment Digest	209
New Jersey Zinc Co.	1706
Ohio Carbon Co.	2430
Ohio Crankshaft Co., Tocco Division	644
Ohio Seamless Tube Co.	1321
Ohio Steel Foundry	151
Olson Testing Machine Co., T.	345
Osborn Mfg. Co.	2407
Packer Machine Co.	1928
Page Steel & Wire Div.	1219
Pako Corp.	1132
Pangborn Corp.	409
Park Chemical Co.	634
Parker-Kalon Corp.	2404
Partlow Corp.	714
Penton Publishing Co.	209
Permenente Products Co.	304
Peters-Dalton Inc.	1828
Peterson Welding Laboratories	1818
Phillips Mfg. Co.	1322
Picker X-Ray Corp.	426
Pines Engineering Co. Inc.	306
Porter-Cable Machine Co.	1409
Porter-MacLeod Machine Tool Co.	1717
Powder Weld Process Co.	1630
Precision Scientific Co.	315
Progressive Welder Co.	1242
Pyrometer Instrument Co.	422
Rack Engineering Co.	2802
Radio Corp. of America	2714
Ransohoff Inc., N.	1020
Ransome Machinery Co.	130
Rapids-Standard Co.	947
Reinhold Publishing Co.	1337
Reynolds Metals Co.	323
Revere Copper & Brass Inc.	1050
Richards Co., J. A.	2016
Roebling's Sons Co., John A.	1342
Riehle Testing Machine Div.	1326
Rogers & Co., G. S.	1514
Ryerson & Son Inc., Jos T.	917
Salkover Metal Processing of Ill.	126
Sargent & Co., E. H.	1722
Schrader's Sons, A., Div. of Scovill Mfg. Co., Inc.	2335
Scientific Electric Division "S" Corrugated Quenched Gap Co.	518
Scott & Son Inc., C. U.	911
Scovill Mfg. Co.	532
Sellers Engineering Co.	614
Sentry Co.	543
Shakeproof Inc.	2502
Shell Oil Co. Inc.	1716
Simonds Saw & Steel Co.	2223
Smith Corp., A. O.	1702
Socony Vacuum Oil Co., Inc.	1518
Solventol Chemical Products Co.	448
South Bend Lathe Works	1025
Specialty Equip. & Mchy. Corp.	206
Spencer Turbine Co.	854
Sperry Products Inc.	2619
Standard Electrical Tool Co.	1914
Standard Plating Rack Co.	A-1821
Steel	209
Steel Parts Mfg. Co.	2318
Stevens Co., Charles G.	1332
Stoody Co.	829
Strand & Co., N. A.	2323
Stuart Oil Co., Ltd., D. A.	416
Stutson Associates, Willis	A-1817
Sunbeam Corp.	916
Superior Tube Co.	1805
Surface Combustion Co.	617
Taco West Corp.	1234
Tennant Co., G. H.	2116
Texas Co.	2215
Tempil Corp.	1622
Tide Water Associated Oil Co.	2535
Tincher Products Co.	1922
Tinnerman Products Inc.	210
Titanium Alloy Mfg. Co.	2607
Torit Mfg. Co.	2316
Towmotor Corp.	2030
Trent Tube Mfg. Co.	1621
Tri-Arc Corp.	1721
Udylite Corp.	350
Union Carbide & Carbon Co.	840
U. S. Reduction Co.	242
Universal Cyclops Steel Corp.	430
Upton Electric Furnace Div.	536
Vacu Blast Co. Inc.	2235
Vanadium Alloys Steel Co.	309
Vanadium Corp. of America	420
Vapor Blast Mfg. Co.	A-1814
War Assets Administration	1249
Welding Engineer-McGraw Hill	1715
Wells Inc., Martin	2824
Wells Mfg. Co.	2204
Weltronic Co.	2915
Western Metals	1918
Westinghouse Electric Corp.	253
Wheelco Instrument Co.	515
Whistler & Sons Inc., S. B.	301
Wilson Mechanical Instrument Co.	938
Yale & Towne Mfg. Co.	116
Yoder Co.	1241



Program for Seminar on

Fundamental Relations in Fracturing Metals

Series of five panel discussion meetings sponsored by ASM and co-ordincted by Case Institute of Technology, Cleveland. Sessions at Palmer House, Oct. 18 and 19

SATURDAY, OCT. 18—10:00 a.m.

Chairmen—George Sachs, Case Institute of Technology, and L. H. Donnell, Illinois Institute of Technology.

General Introduction, by Maxwell Gensamer, Pennsylvania State College.

"Micro-Mechanisms of the Initiation of Fracture," by Clarence Zener, University of Chicago.

"Effects of Stress State on Fracture," by J. E. Dorn, University of California.

SATURDAY, OCT. 18—2:00 p.m.

Chairmen—C. S. Smith, University of Chicago, and D. F. Windenburg, David Taylor Model Basin.

"Effects of Strain on Fracture," by George Sachs, Case Institute of Technology.

"Effects of Structure on Fracture," by J. H. Hollomon, General Electric Co.

"Metallurgical Aspects of Brittle Fracture Phenomena in Structures," by I. G. Slater, British Admiralty Delegation.

"Effects of Section Size on Fracture," by E. R. Parker, University of California.

SATURDAY, OCT. 18—8:00 p.m.

Chairmen—Finn Jonassen, National Research Council, and J. H. Hollomon, General Electric Co.

"Fracture Dynamics," by George Irwin, Naval Research Laboratory.

"Reduction of Data on Ductility of Steel," by W. P. Roop, Swarthmore College.

"Fracturing Characteristics of Low-Carbon Steel," by P. Shearin, North Carolina University.

SUNDAY, OCT. 19—9:00 a.m.

Chairmen—L. E. Grinter, Illinois Institute of Technology, and Maxwell Gensamer, Pennsylvania State College.

"Fracture and Hydrostatic Pressure," by P. W. Bridgman, Harvard University.

"Notch Bar Tensile Testing," by J. D. Lubahn, General Electric Co.

"Report on Conference on Mechanical Properties of Solids at the University of Bristol," by P. Symonds or N. F. R. Nabarro, Naval Research Laboratory.

SUNDAY, OCT. 19—2:00 p.m.

Chairmen—W. P. Roop, Swarthmore College, and J. E. Dorn, University of California.

"New Testing Machines for Combined Stress Experiments," by J. Marin, Pennsylvania State College.

"Time Effect in the Fracture of Materials," by E. Saibel, Carnegie Institute of Technology.

"Dislocation Theory of the Fatigue of Metals," by E. S. Machlin, National Advisory Committee for Aeronautics.

SUNDAY, OCT. 19—6:00 p.m.

DINNER IN HONOR OF DR. P. W. BRIDGMAN

SUNDAY, OCT. 19—8:00 p.m.

Chairmen—G. Irwin, Naval Research Laboratory, and J. Marin, Pennsylvania State College.

"Projected Experimental Study of the General Laws for Deviation From Elastic Behavior Under Combined Stresses," by L. H. Donnell, Illinois Institute of Technology.

"Correlations Between the Fracture of Metals in Shear With Their True Stress-Strain Properties," by T. A. Read, Frankford Arsenal.

TECHNICAL PROGRAM

Morning Sessions at Palmer House;

Afternoon Sessions at International Amphitheatre

Oct. 20 through 24

MONDAY, OCT. 20

10:00 a.m.—Ballroom, Palmer House

"Effect of Carbon Content on the Hardenability of Boron Steels," by G. D. Rahrer and C. D. Armstrong, Carnegie-Illinois Steel Corp.

"Tempering Effects and the Mechanical Equation of State," by J. C. Fisher and C. W. MacGregor, Massachusetts Institute of Technology.

"An Investigation of Tempered Chromium-Silicon Spring Steel," by H. J. Elmendorf, American Steel & Wire Co.

2:00 p.m.—International Amphitheatre

"Induction Hardening of a Quality Controlled Cast Iron," by C. F. Walton, Meehanite Metal Corp. and H. B. Osborn Jr., Ohio Crankshaft Co.

"Some Factors Affecting the Induction Hardening of an Alloy Cast Iron," by J. R. Sloan and R. H. Hays, Caterpillar Tractor Co.

"Study of the Metallurgical Characteristics of Three Induction-Hardened Steels Heated at Various Rates," by James W. Poynter, Wright Field.

TUESDAY, OCT. 21

10:00 a.m.—Ballroom, Palmer House

"Dimensional Stability of Steel—Part II—Further Experiments on Subatmospheric Transformations," by S. G. Fletcher, Latrobe Electric Steel Co., and B. L. Averbach and M. Cohen, Massachusetts Institute of Technology.

"Dimensional Stability of Steel—Part III—Decomposition of Martensite and Austenite at Room Temperature," by B. L. Averbach and M. Cohen, Massachusetts Institute of Technology, and S. G. Fletcher, Latrobe Electric Steel Co.

"Acicular Transformations in Alloy Steel," by E. A. Loria, Mellon Institute of Industrial Research.

10:00 a.m.—Red Lacquer Room, Palmer House

"Beryllium in Magnesium Casting Alloys," by Jay R. Burns, Wright Field.

"Heat Treatment and Properties of Some Beryllium-Nickel Alloys," by W. Lee Williams, U. S. Naval Engineering Experiment Station.

"Stretching Characteristics of Aluminum Alloy Sheet," by J. M. Taub, Los Alamos Scientific Laboratory.

2:00 p.m.—International Amphitheatre

"Location of Alloying Metals in White Cast Iron," by H. A. Schwartz and James Hedberg, National Malleable & Steel Castings Co.

"Graphitization of Steel at Elevated Temperatures," by A. B. Wilder and J. D. Tyson. National Tube Co.

"Concept of the Hydrogen Potential in Steam-Metal Reactions," by Carl A. Zapffe, Baltimore.

WEDNESDAY, OCT. 22

8:00 a.m.—Palmer House

CHAPTER CHAIRMEN'S BREAKFAST

F. B. FOLEY
Vice president and President-elect, ASM

A. L. BOEGEHOLD
President, ASM, 1947

L. W. DELHI
Hunt, Mirk & Co.; president, AWS

H. O. HILL
Bethlehem Steel Co., president-elect, AWS

10:00 a.m.—Ballroom, Palmer House
A.S.M. ANNUAL MEETING
Edward de Mille Campbell Memorial Lecture, by A. B. Kinzel, Electro Metallurgical Co.

12:00 Noon—Palmer House
COLLEGE ALUMNI LUNCHEONS

2:00 p.m.—International Amphitheatre
"Cast Heat Resistant Alloys of the 26% Cr, 20% Ni Type—I," by H. S. Avery and C. R. Wilks, American Brake Shoe Co.
"Cobalt-Chromium J Alloy at 1350 to 1800° F," by N. J. Grant, Massachusetts Institute of Technology.
"Metallography of Hot-Dipped Galvanized Coatings," by D. H. Rowland, Carnegie-Illinois Steel Corp.

8:30 p.m.—Palmer House
ATOMIC ENERGY PROGRAM
"Metallurgical Requirements of the Atomic Energy and Power Production Program," (under the auspices of the Atomic Energy Commission).

THURSDAY, OCT. 23
10:00 a.m.—Ballroom, Palmer House
"Mechanical Properties of Metals at Low Temperatures; A Survey," by L. Seigle and R. M. Brick, University of Pennsylvania.
"Influence of Metallurgical Factors on the Mechanical Properties of Steel," by S. A. Herres and C. H. Lorig, Battelle Memorial Institute.
"Fatigue Strength of Binary Ferrites," by E. Epremian, General Electric Co., and E. F. Nippes, Rensselaer Polytechnic Institute.

12:00 Noon—Palmer House
CANADIAN LUNCHEON

2:00 p.m.—International Amphitheatre
"Bend Test for Hardened High Speed Steel," by A. H. Grobe and G. A. Roberts, Vanadium-Alloys Steel Co.
"Effects of Grinding on Physical Properties of Hardened Steel Parts," by H. E. Boyer, American Bosch Corp.
"Recrystallization as a Measurement of Relative Shot Peening Intensities," by K. B. Valentine, Pontiac Motor Div., General Motors Corp.

7:00 p.m.—Ballroom, Palmer House
A.S.M. ANNUAL BANQUET

FRIDAY, OCT. 24
10:00 a.m.—Ballroom, Palmer House
"Macro-Segregation in Some Alloy Steel Ingots," by J. W. Spretnak, Carnegie Institute of Technology.
"Distribution of Oxygen and Nitrogen in an Alloy Steel Ingot," by C. F. Sawyer, Vanadium-Alloys Steel Co., J. W. Spretnak and G. Derge, Carnegie Institute of Technology.
"Multiple Correlation Applied to Steel Plant Problems," by W. T. Rogers, National Tube Co.

2:00 p.m.—International Amphitheatre
"Detection of As-Cast Austenite Grain Size in Heat Treated Cast Alloy Steels," by E. A. Loria, Mellon Institute of Industrial Research.
"Effect of Silicon on the Properties of Cast Carbon and Carbon-Molybdenum Steels," by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, Crane Co.
"Effect of Homogenization on Cast Steels," by R. J. Marcotte and C. T. Eddy, Michigan College of Mining and Technology.

LECTURE COURSES

INTRODUCTORY PHYSICAL METALLURGY
Monday and Tuesday, Oct. 20 and 21, 4:15 and 8:00 p.m.;
International Amphitheatre
Four Lectures by C. W. Mason, Cornell University.

COPPER AND COPPER ALLOYS
Wednesday, Oct. 22, 4:15 and 8:00 p.m.;
Thursday, Oct. 23, 4:15 p.m.—International Amphitheatre
Three Lectures by O. W. Ellis, Ontario Research Foundation.

PROGRAM

AMERICAN WELDING SOCIETY

Twenty-eighth Annual Meeting

All Sessions at Hotel Sherman, Oct. 19-24

SUNDAY, OCT. 19
5 to 7 p.m.—President's Reception
Louis XVI Room

MONDAY MORNING, OCT. 20
General Session
Ballroom
"Directional Welding to Minimize or Eliminate Distortion in Weldments and Control Residual Stresses," by Joseph Holt, consulting engineer.
"Precision Pressure Regulation of Various Gases," by J. K. Hamilton, Air Reduction.
"Welded Fabrication," by Ray Stitt, R. C. Mahon Co

Railroad Welding
Louis XVI Room
"Flame Hardening Locomotive Brake and Spring Rigging Pins and Bushings," by B. W. Covell, Northern Pacific Railway Co.
"End-Hardening of Rails and Open-hearth Frogs," by R. W. Torbert, Oxweld Railroad Service Co.
(*Continued next page*)

(*Continued from preceding page*)

"New Developments in Railroad Maintenance-of-Way Work," by C. A. Daley, Air Reduction.
"Problems in Resistance Welding Stainless Steel Railway Car Structures," by J. Van den Beemt, The Budd Co.

Air Conditioning and Refrigerators
Crystal Room

"Welding in Assembly Line Production of Refrigerator Cabinets," by P. Bowman, Seeger Refrigerator Co.
"High-Speed Automatic Oxy-Acetylene Welding," by H. O. Jones, Air Reduction.

MONDAY EVENING, OCT. 20
Awards of Prizes and Medals, Adams Lecture
Ballroom

"Structural Strength of the Welded Joint," by G. S. Mikhalapov, Air Reduction Sales Co.

TUESDAY MORNING, OCT. 21
Pressure Vessels
Louis XVI Room

"Welding of Locomotive-Type High-Pressure Boilers," by George M. Trefts, Farrar and Trefts Inc.
"Carbon-Arc Welding of Copper Pressure Vessels," by John J. Vreeland, Chase Brass & Copper Co.
"Integral Cast Bosses for Pressure Vessels," by H. L. Anthony and H. P. Schane, Scaife Co.
"Development of Butt Welded Joints in Pressure Vessels," by Edwin J. Brown, Union Iron Works.

Miscellaneous
Crystal Room

"Multi-Flame Pressure Welding Process," by N. H. Cuke, Canadian Liquid Air Co., Ltd.
"Controlled Low-Temperature Stress-Relieving of Welded Tanks for Wet Seal Gas Holder," by R. Kraus, Stacey Bros. Gas Construction Co.
"Composite Alloy Fabrication With the Hidden Arc," by H. E. Cable, Lincoln Electric Co.
"Semiautomatic Welding With Standard Manual Arc Welding Equipment," by F. W. Myers, Jr., Watertown Arsenal.

Research
Ballroom

"Determination of Physical Chemical Factors in Stress-Corrosion Cracking of Mild Steel," by H. J. McDonald and M. G. Winterstein, Illinois Institute of Technology.
"Some Unusual Features Encountered in the Investigation of Cracked Welds in 35/15 Magnesium Retorts," by H. J. Nichols, Dept. of Mines and Resources, Ottawa, Ont., Canada.
"Distribution of Strength and Ductility in Welded Steel Plate as Revealed by the Static Notch Bar Tensile Test," by W. F. Brown, Jr., L. J. Ebert and G. Sachs, Case Institute of Technology.

TUESDAY AFTERNOON, OCT. 21
Pipe and Maintenance Welding
Louis XVI Room

"Metallurgical Properties of High-Yield Strength Seamless Line Pipe," by A. B. Wilder and J. D. Tyson, National Tube Co.
"The Maintenance Welder," by Cleo E. Hook, Noblett Sparks Industries, Inc.
"Welding on the Farm," by R. N. Blasingame, Pennsylvania State College.

Research
Ballroom

"Low-Temperature Charpy Tests of Various Ferritic Weld Deposits," by W. B. Bunn, M. W. Kellogg Co.
"Effect of Titanium and Vanadium on the Mechanical Properties and Weldability of Experimental Low-Alloy, High-Tensile Steel," by George G. Luther, Donald B. Roach, and Carl E. Hartbower, Naval Research Laboratory.
"Effects of Section Size on the Static Notch Bar Tensile Properties of Mild Steel Plate," by W. F. Brown, Jr., J. D. Lubahn and L. J. Ebert, Case Institute of Technology.

High Alloys
Crystal Room

"Welding and Fabrication of High-Temperature Alloys," by C. G. Chisholm, Haynes Stellite Co.
"Some Factors Controlling the Ductility of 25 Cr, 20 Ni Weld Deposits," by O. R. Carpenter and N. C. Jessen, Babcock & Wilcox Co.
"Selection of Austenitic Electrodes for Welding Dissimilar Metals," by Anton L. Schaeffler, Arcos Corp.

TUESDAY, OCT. 21, 7:45 p.m.
University Research Conference

WEDNESDAY MORNING, OCT. 22
Resistance Welding
(*Louis XVI Room*)

"Flash Welding of the Structural Aluminum Alloys," by R. Condit Becker and Robert M. Curran, Rensselaer Polytechnic Institute.
"Some Metallurgy Aspects of Carbon Steel Spot Welding," by Julius Heuschkel, Westinghouse Research Laboratories.
"Engineering Symposium of Future Control of Resistance Welding Machines," by C. E. Smith, Taylor-Winfield Corp.
"A Study of Projection Welding," by W. F. Hess and Wylie J. Childs, Rensselaer Polytechnic Institute.

Cutting
(*Ballroom*)

"Powder Cutting as a Production Tool," by D. H. Fleming, Jr., The Linde Air Products Co.
"The Theory of Oxy-Arc Cutting," by H. C. Campbell, Arcos Corp.
"Flux Cutting Alloy Steels," by G. E. Bellew, Air Reduction.
"Oxy-acetylene Production Cutting in Steel Mills," by A. H. Yoch and W. Begerow, Air Reduction.

Ship Structures Research
(*Crystal Room*)

"Causes of Cleavage Fracture in Ship Plate—Tests of Wide Notched Plates," by A. Boodberg, H. E. Davis, E. R. Parker, and G. E. Troxell, University of California.
"Cleavage Fracture of Ship Plates as Influenced by Size Effect," by W. M. Wilson, R. A. Hechtman, and W. H. Bruckner, University of Illinois.
"A Study of Internally Notched Tensile Specimens for Evaluating the Toughness of Structural Steel," by H. R. Thomas and D. F. Windenburg, David Taylor Model Basin, U.S.N.
"Investigation of Steels Removed From Fractured Ships," by G. A. Ellinger and Morgan L. Williams, U. S. Bureau of Standards.

WEDNESDAY AFTERNOON, OCT. 22
Resistance Welding
(*Louis XVI Room*)

"Heat Treatment of Spot Welds of Steel Plate," by W. d'Orville Doty, Wylie J. Childs and W. F. Hess, Rensselaer Polytechnic Institute.
"Development and Application of Quality Control Techniques to Resistance Welding Production," by O. C. Frederick, General Electric Co.
"Shunt Circuit Impedance in Spot Welding," by Robert Blair, Taylor-Winfield Corp.

Nonferrous
(*Crystal Room*)

"Arc Welding Copper and Copper-Base Alloys," by F. E. Garriott, Ampco Metal, Inc.
"Static Strength Tests of Fillet Welds on Aluminum Alloy 61 S-T Plate," by R. L. Moore, Aluminum Co. of America.
"Welding of Bronze Gears With a Steel Web and Hub," by Otto D. Klug, Alloys Welding Specialists Co.

Ship Structures Research
(*Ballroom*)

"Work of the Ship Structures Committee," by Rear Admiral Ellis Reed-Hill, Chairman Committee, U. S. Coast Guard.
"Test of Various Designs of Welded Hatch Corners for Ships," by E. Paul DeGarmo, University of California.
"Correlation Investigations of Small Specimens With Wide Plate Tests," by Maxwell Gensamer, Pennsylvania State College.

E. A. ANDERSON
Chairman, Institute of Metals Division

CLYDE WILLIAMS
President, AIME, 1947

THOMAS S. WASHBURN
Chairman, Iron and Steel Div., AIME; courtesy Fabian Bachrach

"A Method of Evaluating Transition From Shear to Cleavage Failure in Ship Plate and Its Correlation With Large Scale Plate Tests," by Noah A. Kahn and Emil A. Imbembo, New York Naval Shipyard.

THURSDAY MORNING, OCT. 23
Alloy Steels
(Louis XVI Room)

"Factors Affecting Weldability of Carbon and Alloy Steels," by C. E. Jackson, K. H. Koopman and C. M. Offenhauer, Union Carbide & Carbon Research Labs.
"Submerged Melt Welding of Steels of High Hardenability," by E. A. Clapp and E. L. Frost, Union Carbide & Carbon Research Labs.
"Macro-Etching and Photomacrography of Ferritic and Austenitic Welded Joints in Low-Alloy Steel," by O. O. Miller and E. G. Houston, United States Steel Corp.

Miscellaneous
(Crystal Room)

"Design of Arc Welded Steel and Its Relation to Cost, Motion Picture," by R. H. Davies, Lincoln Electric Co.
"High-Speed Technicolor Motion Picture of Welding Arc," by G. E. Claussen, Reid-Avery Co.
"High-Speed Heliarc Welding," by H. E. Rockefeller, Linde Air Products Co.
"Stud Welding," by R. C. Singleton, Nelson Sales Corp.

Structural
(Ballroom)

"Design and Construction of Welded Research Laboratory Building," by La-Motte Grover, Air Reduction.
"Shape-Welding by the Submerged Melt Process," by J. A. Kratz, Linde Air Products Co.
"Studies on Effect of Red Lead Paints on the Quality of Metal-Arc Welds in Structural Steel," by R. W. Bennett, R. D. Williams and C. B. Voldrich, Battelle Memorial Institute.

THURSDAY EVENING, OCT. 23
6:30 p.m.—Annual Banquet
(Grand Ballroom, Mezzanine)

FRIDAY MORNING, OCT. 24
Inert Gas Welding
Louis XVI Room

"Mechanized Inert-Gas-Shielded Arc Welding," by H. T. Herbst, Linde Air Products Co.
"New Applications of Inert-Arc Welding," by R. W. Tuthill, General Electric Co.

FRIDAY AFTERNOON, OCT. 24
Business Session—2:00 P.M.
Crystal Room
Board of Directors Meeting—3:00 P.M.
Room 118

A.I.M.E. PROGRAM—FALL MEETING OF METALS DIVISION

All Meetings at Stevens Hotel, Oct. 20-22

MONDAY, OCT. 20
10:00 a.m.—Copper and Copper Alloys
(Institute of Metals Division)

"Some Observations of Lineage in Copper Crystals," by W. R. Hibbard Jr.
"Isothermal Transformation of a Eutectoid Aluminum Bronze," by D. J. Mack.
"Preferred Orientations in Drawn and Annealed 70-30 Alpha Brass," by W. R. Hibbard Jr.

12:30 p.m.—Executive Committee Luncheon and Meeting
(Institute of Metals Division)

2:00 p.m.—Recrystallization and Grain Growth
(Institute of Metals Division)

"Comparative Properties of Several Types of Commercial Coppers as Cold Worked and as Recrystallized," by L. R. Jackson, A. M. Hall, and A. D. Schwope.
"Effect of Mechanical Deformation on Grain Growth in Alpha Brass," by J. E. Burke and Y. G. Shiau.
"Grain Growth in High-Purity Aluminum and in an Aluminum-Magnesium Alloy," by P. A. Beck, J. C. Kremer, L. J. Demer, and M. L. Holzworth.

2:00 p.m.—Metallography
(Iron and Steel Division)

"Austenite Transformation Above and Within the Martensite Range," by R. T. Howard Jr., and M. Cohen.
"Behavior of Metal Cavity Liners in Shaped Explosive Charges," by G. B. Clark and W. H. Bruckner.
"Testing Gun Steel and Other Alloys and Metals for Resistance to Surface Cracking," by E. Ingerson.

TUESDAY, OCT. 21
9:30 a.m.—Light Metals
(Institute of Metals Division)

"Vacuum Process for Preparation of Lithium Metal From Spodumene," by R. G. Stauffer.
"Purification of Aluminum and Its Alloys," by Y. Dardel.
"Quenching of 75S Aluminum Alloy," by W. L. Fink and L. A. Willey.
"Factors Involved in Heat Treating a Magnesium Alloy," by A. E. Flanigan, I. I. Cornet, R. Hultgren, J. T. Lapsley and J. E. Dorn.

10:00 a.m.—Steelmaking
(Iron and Steel Division)

"Structure, Segregation and Solidification of Semikilled Steel Ingots," by M. Tenenbaum.

12:30 p.m.—Executive Committee Luncheon and Meeting
(Iron and Steel Division)

2:00 p.m.—Surface Films and Corrosion
(Joint Meeting of Both Divisions)

"Passivity in Chromium-Iron Alloys; Adsorbed Iron Films on Chromium," by H. H. Uhlig.
"Thin Oxide Films on Molybdenum," by E. A. Gulbransen and W. S. Wysong.

(Continued next page)

A. I. M. E. Program—Hotel Stevens

(*Continued from preceding page*)

"Thin Oxide Films on Tungsten," by E. A. Gulbransen and W. S. Wysong.
"Effect of Tension and Compression on the Corrosion of an Aluminum Alloy," by W. D. Robertson.

6:00 p.m.—Cocktail Party

7:00 p.m.—Annual Fall Dinner of Metals Divisions
Hotel Stevens

WEDNESDAY, OCT. 22

2:00 p.m.—General Session

(*Joint Meeting of Both Divisions*)

"Plating Molybdenum, Tungsten and Chromium by Thermal Decomposition of Their Carbonyls," by J. J. Lander and L. H. Germer.
"An Electrolytic Method for Pointing Tungsten Wires," by W. G. Pfann.
"Tantalum Powder by Magnesium Reduction," by J. Prieto Isaza, A. J. Shaler and John Wulff.

PROGRAM
AMERICAN INDUSTRIAL RADIUM AND X-RAY SOCIETY

Seventh Annual Meeting

All Sessions at Hotel Morrison, Oct. 22-24

WEDNESDAY, OCT. 22

9:30 a.m. to 12 Noon

"Profitable Mass X-Ray Inspection," by Justin G. Schneeman.
"Skin Thickness in Bronze Castings as Shown by X-Ray of Thin Sections," by Carleton G. Lutts.
"Polaroid Vectograph Technique Applied to Stereo-Microradiography," by Don M. McCutcheon and Merle F. Valade.

2 p.m. to 4:30 p.m.

"Development of a Universal Exposure Slide Rule for Radium Radiography," by Jay Eland and N. A. Kahn.
"Use of Isotopes in Industrial Radiography," by Gerold H. Tenney.
'A Metallurgical Problem Solved by X-Ray Diffraction," by Herbert Mermagen.

THURSDAY, OCT. 23

9:30 a.m. to 12 Noon

"Analysis of Industrial Problems—Co-ordinated Spectroscopy and X-Ray Diffraction," by W. J. Poehlman and W. A. Kluck.
"Automatic Processing of X-Ray Film," by F. Glenn Hamilton and Robert Sardeson.
"Influence of Field Size on Contrast and Exposure in Industrial Radiography," by E. Dale Trout and A. L. Pace.

2 p.m. to 4:30 p.m.—Lester Lecture and Annual Meeting

"Nondestructive Testing in the Design, Manufacture, and Evaluation of Naval Ordnance," by Leslie W. Ball.

FRIDAY, OCT. 24

9:30 a.m. to 12 Noon

"Application of Radiography in Die Casting," by R. W. Dively.
"Electronic Applications to Nondestructive Testing," by Arthur E. Johnson.
"Deflected Beam Technique in Million-Volt Radiography," by Harold Wagner and Don M. McCutcheon.

2 p.m. to 4:30 p.m.

"Application of the 20-Million-Volt Betatron to Industrial Radiography," by Jack T. Wilson.
"Van De Graaff 2-Million-Volt X-Ray Precision Radiographic Technique," by A. E. Burrill.
"Use of Filters in Million-Volt Radiography," by G. M. Corney.

TECHNICAL PAPERS

Scheduled to be presented in Chicago during the National Metal Congress and Exposition, following papers are digested to aid visitors in determining which sessions are of most interest to them

Influence of Metallurgical Factors on Mechanical Properties of Steel

By S. A. Herres and C. H. Lorig, Battelle Memorial Institute, Columbus, O.

Data are presented to illustrate the individual influences of the following metallurgical conditions on the strength and toughness of steel: Nonmetallic inclusions, austenite decomposition products, austenite grain size, and various precipitations which occur during tempering.

For steels fully hardened by quenching and not subjected to any form of tempering embrittlement, the strength-toughness data are plotted as a scatter-band of width determined by the amount, distribution, and directionality of nonmetallic inclusions. The influences of incomplete quench-hardening or of tempering at temperatures where secondary hardening occurs are shown to be very detrimental to toughness.

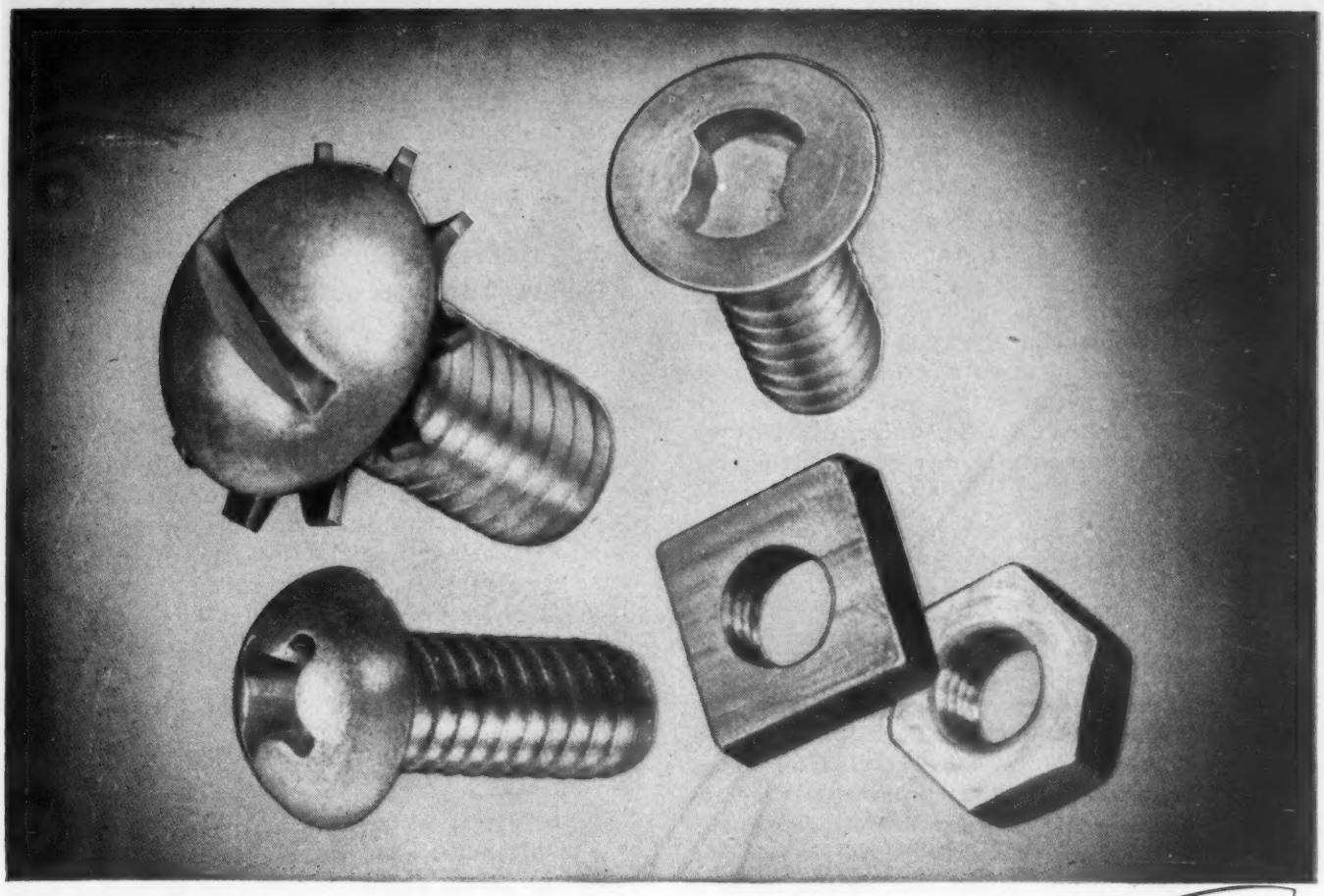
Data were obtained which indicate that, in the absence of grain boundary precipitates, or envelopes, toughness is not markedly affected by a large increase in austenitic grain size. It was found that the addition of nitride-stabilizing elements did not affect the susceptibility to temper brittleness of several steels.

Concept of Hydrogen Potential in Steam-Metal Reactions

By Carl A. Zapffe, consultant, Baltimore

A thermodynamic study of numerous reactions of metals and alloys with moisture develops the concept of the "hydrogen potential"—a chemical attribute of the hydrogen released during the moment of reaction which generates known or calculable pressures of hydrogen in a closed system and which can therefore in turn be measured in terms of those pressures.

Since the absorption of hydrogen by metals is a function of the hydrogen pressure, these "hydrogen potentials" provide a basis for calculating the liability



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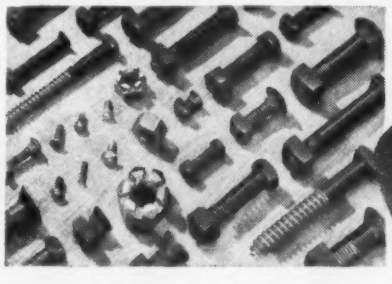

of the various metal systems to hydrogen pick-up from the moisture reaction.

Calculations for iron, steel, stainless steel, nickel, chromium, manganese, silicon, aluminum, and magnesium are presented in graph form, and the significance of the plots is discussed. Conditions over a wide range of temperature and a wide range of humidities and steam pressures yield calculations which readily explain numerous metallurgical phenomena, such as gassiness in ferritic stainless steels, gassiness in siliconized iron and steel, pinhole porosity in magnesium and aluminum, anomalous low ductility in killed steels, decarburization of steam superheaters, embrittlement of steam boilers, differences between steels made in summer and in winter, and between pig irons made in southern and in northern climates, and so forth.

Location of Alloying Metals In White Cast Iron

By H. A. Schwartz, manager of research and James Hedberg, research department, National Malleable and Steel Castings Co., Cleveland

This paper constitutes an attempt to determine how metallic alloying elements in white cast iron distribute themselves between cementite and ferrite during freezing and cooling. Electrolytic methods were relied on to separate the two phases. Molybdenum and chromium conform pretty well to the Nernst principle that the concentrations in the two phases are in a constant ratio. Nickel conforms to this ratio if it be assumed that the first nickel present is combined as a separate phase. This distribution of manganese follows much more complex patterns, which are described in some detail. The distribution is related to the sulphur content.

Some Factors Affecting Induction Hardening of Alloy Cast Iron

By J. R. Sloan, staff metallurgist and R. H. Hays, metallurgical engineer, Caterpillar Tractor Co., Peoria, Ill.

Induction hardening of bore surface of gray cast iron cylinder liners, utilizing frequencies of 3000 and 9600 cycles per second (cps), is discussed. Power inputs were varied for the 9600-cps current.

An unexpected variance in results, when compared to similar treatments for steel, indicated additional factors are being introduced which have a considerable effect on the physical properties. Higher frequency concentrates the heat energy input closer to the surface with a consequent increase in temperature. For a medium carbon steel, this overheating produces a coarsening of structure, grain growth and a reduction in physical properties. However, for an overheated cast iron, these same effects occur, along with some absorption of segregated alloys and resolution of graphite, thereby resulting in increased retention of austenite and a reduction of the expected surface hardness. In addition, certain low melting constituents usually not found in steel may be momentarily melted.

Evidence to substantiate these conclusions is given by photomicroscopic methods, subzero cooling, microhardness tests and by chemical and x-ray analyses. Comparisons with structures conventionally hardened were made in order that a correlation of temperature and microstructure could be shown. The formation of several unusual structures found principally in the hardened cases of the 9600-cps liners was also investigated.

Recrystallization as Measurement of Relative Shot Peening Intensities

By K. B. Valentine, project engineer, Pontiac Motor Division General Motors Corp., Pontiac, Mich.

Phenomena of recrystallization and grain growth of critically strained, low carbon steel at subcritical temperatures were used as a means of determining the depth to which the cold work introduced by shot peening penetrated.

Data from tests utilizing this method indicate that depth of penetration is increased: (a) By increase of shot size; (b) by increase of shot velocity; (c) by increase of time of peening. Penetration depths up to 0.025-inch were observed.

Stretching Characteristics of Aluminum Alloy Sheet

By J. M. Taub, Los Alamos Scientific Laboratory, Los Alamos, N. Mex.

A number of factors which influence the stretching of aluminum alloy sheet were investigated. The minimum strain located in the area in contact with the punch, and the maximum strain occurring in the unrestricted area between punch and gripping radius were affected primarily by the ratio of metal thickness to gripping radius, frictional conditions as determined by type of lubrication, temper of the metal and edge conditions, chiefly of 24ST. Other variables investigated affected the strains only to a limited extent.

Most of the experimental work was conducted with a single-contoured punch. A few results using a double-contoured punch indicated that parts having a relatively shallow curvature in two directions are affected by variations in processing condition similar to a singly curved part.

Heat Treatment and Properties of Some Beryllium-Nickel Alloys

By W. Lee Williams, metallurgist, U. S. Naval Engineering Experiment Station, Annapolis, Md.

With the use of strip material 0.012-inch thick, studies have been made on the effects of time and temperature on the resulting precipitation hardness of a 2.07 per cent beryllium-nickel alloy of commercial purity. Amount of cold working prior to aging, as well as recrystallization at some of the aging temperatures, are shown to exert considerable influence on the locations and shapes of the time-hardness diagrams at various temperatures. Results demonstrated that hardnesses above 500 brinell could be attained within a few hours.

Information gained from the strip material served as a basis for the heat treatment of a cold-rolled 13/16-inch diameter bar containing 1.62% beryllium. Specimens from this material were tested in the

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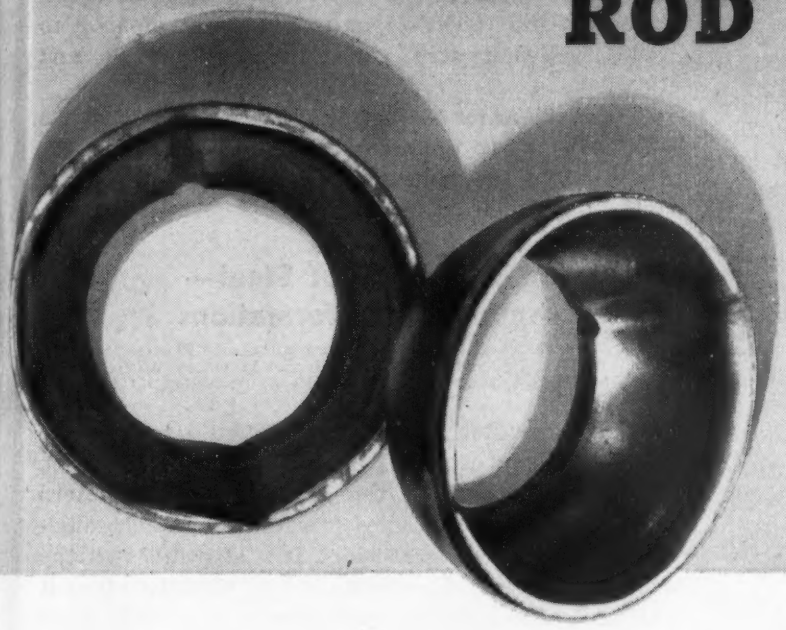

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Distribution of Oxygen and Nitrogen in an Alloy Steel Ingot

By C. F. Sawyer, metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.; J. W. Spretnak, staff member and G. Derge, associate professor of metallurgy and member of staff, metals research laboratory, Carnegie Institute of Technology, Pittsburgh

The distribution of oxygen and nitrogen in a 26 by 26-inch ingot of SAE 4335 steel was studied by means of the vacuum fusion method of analysis. Groups of ten adjoining 12-gram samples from ten positions in the ingot were analyzed.

Results demonstrate that a surprising degree of local heterogeneity exists in the distribution of nitrogen and especially oxygen in an ingot. This is undoubtedly a result of the fact that oxygen and nitrogen mainly occur in the form of oxides and nitrides which are heterogeneously distributed. Major difference between the distribution of oxygen and nitrogen in the ingot is that no ingot position was found in which the average nitrogen content was significantly different statistically from the average nitrogen content of the other ingot positions studied.

Induction Hardening of a Quality Controlled Cast Iron

By C. F. Walton, foundry engineer, Meehanite Metal Corp., New Rochelle, N. Y. and H. B. Osborn Jr., director of research, Tocco Division, Ohio Crankshaft Co., Cleveland

Ready response of the as-cast structure of the material studied makes it especially well suited to the short heating cycles inherent with the use of induction heating. A matrix devoid of free ferrite and consisting of either fine pearlite or sorbite and pearlite permits practically instantaneous carbide solution.

Thereby more advantage can be taken of the shallow depth of heating provided by high frequency since greater depths of hardness resulting from soaking time can be minimized. Further, with induction hardening, this material develops unusually favorable properties of high wear resistance without loss of strength.

Cobalt-Chromium J Alloy at 1350 to 1800° F

By Nicholas J. Grant, assistant professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

A new cast alloy designated as the "J" alloy has been developed using the original Co-Cr-Mo-base Vitallium as a starting point. A wide range of carbon contents was tried which established the optimum content at about 0.76 per cent. It is shown that through variations in alloying combinations a large strength increase at high temperatures is possible using ordinary Vitallium as a base. At all carbon values from about 0.2 per cent up to maximum, the J alloy shows better rupture properties in the overall range of 1350 to 1800° F than previous Co-Cr alloys reported in the literature.

It is also stronger than any of the forged alloys at 1350° F for rupture times up to 1000 hours and for much longer times above 1350° F. With correct casting control good reproducibility of test results has been achieved. Optimum aging treatments are shown for the J and other alloys in the Co-Cr system.

Use of 0.1 to 0.7 per cent cerium mischmetall did not improve rupture life of the J alloy or of cast high carbon N-155 (95NT-2) at temperatures of 1500 to 1800° F. Results were generally poorer at 1700 and 1800° F.

Creep values for the 37J alloy at 1500° F are shown and are equal to the other best Co-Cr alloys but are poorer than the values obtained with Ni-Cr-Co-Fe-base alloys such as N-155.

Dimensional Stability of Steel—Subatmospheric Transformations

By S. G. Fletcher, chief metallurgist, Latrobe Electric Steel Co., Latrobe, Pa. and B. L. Averbach and M. Cohen, department of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Transformation of retained austenite by subzero cooling was investigated in three typical tool steels, and the stabilization of this austenite toward subzero transformation was studied as a function of austenitizing and tempering treatments. It is shown that if the amount of retained austenite is low, virtually all of it can be transformed by immediate refrigeration after quenching. However, if the amount of retained austenitic is high, only a fraction of it can be transformed by refrigeration. Almost complete stabilization in either case may be obtained by tempering prior to subcooling.

Activation energies have been obtained for the effect of tempering on the contraction of martensite and on the stabilization of austenite, and these energies are sufficiently different to suggest that stabilization is not controlled by the martensite contraction.

Mechanical Properties of Metals at Low Temperatures

By L. Seigle, staff member and R. M. Brick, director, department of metallurgy, University of Pennsylvania, Philadelphia

Among the various phenomena observed in metals at very low temperature, changes in mechanical properties are the particular interest of the metallurgist. Two distinct paths of investigation of this subject have been followed: Tests of polycrystalline metals and of single metal crystals, and the results from each compose bodies of more or less uncorrelated data which will be separately reviewed here.

Only face-centered cubic metals retain their ductility as the deformation temperature approaches absolute zero. The embrittlement of iron somewhat below room temperature is matched by an analogous loss in ductility at some characteristic temperature of all body-centered cubic or hexagonal metals. Embrittlement of iron with decrease in temperature can be explained, in mechanical terms, by a more rapid increase in the stress required to cause deformation than in the stress required to cause fracture.

Loss in ductility of iron cannot be explained in terms of strain gradient. At low temperatures, both the strain hardening exponent and viscosity coef-

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ficient of most steels increase, yet deformation is localized and the metal embrittled, whereas comparable changes in the rate of strain hardening and viscosity of alpha brass result in an anticipated low strain gradient, high energy absorption, or, in other words, more ductile behavior.

Macrosegregation in Alloy Steel Ingots

By J. W. Spretnak, member of staff, metals research laboratory, Carnegie Institute of Technology, Pittsburgh

Macrosegregation in six alloy steel ingots is examined, using the published allowable errors in the analysis of steel as the criterion in establishing the occurrence of segregation. A considerable variation in the amount of segregation was found among the six ingots. About half the segregation patterns agree with the previously published pattern of positive and negative segregation in killed steel ingots.

Segregation ratios for the various elements vary in magnitude from ingot to ingot, but the order of these ratios for the elements remains fairly constant. There is no consistency in the particular element that yields the maximum number of analyzed positions in the ingot showing segregation among the six ingots studied.

Dimensional Stability of Steel—Martensite, Austenite Decomposition

By B. L. Averbach and M. Cohen, department of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; and S. G. Fletcher, chief metallurgist, Latrobe Electric Steel Co., Latrobe, Pa.

Decomposition of martensite and retained austenite at room temperature was measured in a plain carbon tool steel and a ball bearing steel by observing the dimensional changes which occur in hardened specimens as they age at room temperature. Martensite contractions are simply additive and proceed along a basic reaction curve at room temperature. Tempering hastens the initial shrinkage, but subsequent contraction at room temperature proceeds as though the initial contraction occurred at room temperature. An equation was fitted to the basic reaction curve so that it is possible to predict the dimensional behavior of martensite after a given tempering treatment.

Retained austenite decomposes isothermally at room temperature to cause an increase in length. Tempering decomposes some austenite, but the reaction is not additive because of a large stabilizing effect which also occurs during the tempering treatment.

In these experiments, rolling direction has little effect on dimensional behavior, but interrupting the hardening quench above room temperature markedly influences the behavior of the retained austenite.

Tempered Chromium-Silicon Spring Steel

By H. J. Elmendorf, metallurgical spring engineer, American Steel & Wire Co., Worcester, Mass.

This paper presents results of an investigation of the effects of heat treatment on tempered chromium-silicon spring steel. The tension stress-strain curves for stress relieved, "blued", chromium-silicon spring wires show marked changes in shape as a function of the bluing temperature and these changes have been found to be associated with the hardness of the tempered wire. Said changes in the stress-strain curves are reflected in the mechanical property study of the blued spring wires.

Helical compression springs coiled from chromium-silicon wire of three hardnesses show the optimum room temperature spring properties to be associated with the wire of highest hardness, rockwell C-52.5, after bluing at 700° F (370° C). However, the 72-hour elevated temperature spring tests at 400, 500 and 600° F (205, 260 and 315° C) show the optimum results from rockwell C-48.5 to C-50 wires. From the results obtained, it is observed that chromium-silicon steel is superior to SAE 6150 under the conditions studied.

Fatigue Strength of Binary Ferrites

By E. Epremian, research laboratory, General Electric Co. and E. F. Nippes, assistant professor of metallurgy, Rensselaer Polytechnic Institute.

An investigation was made of the specific strengthening effect of alloying elements in binary solid solution on the endurance limit of ferrite. Results of tests on samples in the Quinlan pneumatic fatigue machine indicate that the relative order of effectiveness is: Ti, Mo, Si, Mn, Ni, Co and Cr. The effectiveness of these elements varies inversely with the extent of solid solubility in iron.

Observations of the change in the power requirements to maintain a bar at constant stress during the progress of a fatigue test are associated with changes in the damping capacity due to cold work. The occurrence of fatigue failure is defined by a decrease in the natural frequency of the sample, and the minute crack formed is detected with the supersonic Reflectoscope.

Mechanical Equation of State

By J. C. Fisher, department of mechanical engineering and C. W. MacGregor, professor of applied mechanics, Massachusetts Institute of Technology, Cambridge, Mass.

Notion of a mechanical equation of state is extended to include materials in which the process of tempering is proceeding. A composite variable p, including the combined effects of tempering temperature and time, is introduced as a measure of degree of tempering. Tension tests of true stress-strain type, conducted at constant true strain rates on SAE 1045 steel, are employed to show effects of tempering on the true stress-strain properties.

It is shown that the tempering process is independent of strain, supporting the view that in the absence of recrystallization and similar phenomena the stress reaction in a specimen composed of tempered martensite depends only on the instantaneous values of the testing temperature, strain, strain rate and tempering parameter p.

Effect of Silicon on Properties of Cast Carbon and Carbon-Molybdenum Steels

By N. A. Ziegler, research metallurgist and J. R. Goldsmith, metallurgical engineer in charge of research foundry, Crane Co., Chicago

Effect of silicon on thermal characteristics, microstructures, physical properties and weldability of plain carbon and carbon-molybdenum cast steels of three different carbon contents (0.1 max., 0.15 and 0.30 per cent carbon) has been investigated. Results obtained

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by increasing the silicon content in these steels from 0.3 to 2 per cent are presented.

Transformations on cooling tend to be raised by increasing the silicon content from about 0.6 to 2 per cent. An exception occurred in some of the high silicon, molybdenum-bearing steels in which the microscope revealed a small amount of a suppressed transformation constituent. General trend, however, is for thermal sluggishness to decrease with increasing silicon. This decrease is probably due to the fact that silicon increases the amount of residual delta ferrite at elevated temperatures.

Increasing silicon content of carbon and carbon-molybdenum steel from 0.3 to 2 per cent produces (a) moderate increase of tensile strength, yield point and hardness, (b) moderate decrease of elongation and reduction of area, and (c) a considerable reduction of impact resistance, which becomes more pronounced as the silicon content increases above 1 per cent.

Metal arc welding of steels with the silicon content as high as 2 per cent did not present any difficulties. Maximum hardnesses were quite low across the affected zones of the "as-welded" steels.

Bend Test For High Speed Steel

By Arthur H. Grobe, research metallurgist and George A. Roberts, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.

Object of this investigation was to develop the bend test as a useful tool for measuring the "toughness" of tool steels and to apply this test to high speed steels. In the development of the test, three factors were investigated: The specimen size; single and double point loading; and the number of specimens necessary to obtain reasonably accurate values of yield strength, bend strength, plastic deflection and total deflection.

Bend test properties were determined for an 18-4-1 high speed steel quenched from six different temperatures 2000 to 2400° F (1095 to 1315° C). The effect of tempering on the bend test properties over a wide range of tempering times and temperature was studied for two high speed steels (18-4-1 and 6-5-2 types).

Characteristics of Induction-Hardened Steels

By James W. Poynter, metallurgist, materials laboratory, Engineering Division, Wright Field, Dayton, O.

Specimens of SAE 1045, 1.06 per cent carbon drill rod and SAE 4340 steels in the pearlitic, normalized, and spheroidized (drill rod only) prior conditions are induction heated at various heating rates to a temperature slightly above the critical and to 1040° C (1900° F). Eberbach microhardness determinations and metallographic examinations are made on the hardened zone. It is found that the hardness increases with heating time until sufficient carbon to produce full hardness has been dissolved and that the hardness then decreases slightly with longer heating times. This decrease is attributed to the presence of more retained austenite in the structure resulting from quenching a more homogeneous austenite.

All the data can readily be explained by the conventional processes of solution, diffusion and transformation. It is suggested that the so-called superhardness is due partially to internal stresses, partially to less retained austenite resulting from quenching a nonhomogeneous austenite formed on rapid heating, and partially to the Burns, Moore and Archer values for the maximum hardness of steels of various carbon contents being slightly low for the higher carbon steels due to the presence of some retained austenite in the specimens used in their investigation.

Austenite Grain Size

By Edward A. Loria, fellow, Mellon Institute of Industrial Research, Pittsburgh

This paper gives an account of a method of measuring the as-cast austenite grain size in cast alloy steels by considering the effects of solidification pattern and segregation of alloying elements on the development of the as-cast grain pattern.

In rapidly cooled sections, the marked segregation results in increased local hardenability and the development of an outline of the initial austenite grain boundaries upon etching with the proper reagent. In the manganese-molybdenum cast steels studied, normalizing or quenching and tempering followed by etching with a modified picral solution produces the necessary split transformation in the alloy-rich and alloy-poor localities and a microstructural delineation of the intercell network (as-cast austenite) existing in such steels.

Effect of Homogenization on Cast Steels

By R. J. Marcotte, associate professor, metallurgical engineering and C. T. Eddy, head department of metallurgical engineering, Michigan College of Mining and Technology, Houghton, Mich.

Effects of homogenization heat treatments on the hardenability, the impact properties and the time-temperature-transformation curves for certain selected cast steels were studied. The steels were supplied in the form of test bars (1¼ by 1¼ by 6 inches) cut from keel block coupons. All samples were cut from these bars. Standard testing procedures were employed throughout. The investigation revealed that for the steels studied and for the time and temperatures of homogenization employed, the effects on the mechanical properties, attributable solely to homogenization, are negligible.

Grinding Hardened Steel Parts

By Howard E. Boyer, chief metallurgist, American Bosch Corp., Springfield, Mass.

An intensive study was made of the unbalanced residual stresses induced by grinding on highly hardened steel parts and the ultimate effect of such stresses upon physical properties. Hardened SAE 52100 steel was used exclusively as the material for study though it is indicated that the findings may be applied to other steels of the deep hardening type. Results of this investigation establish the fact that fatigue and other physical properties are seriously affected by incorrect planning of grinding operations.

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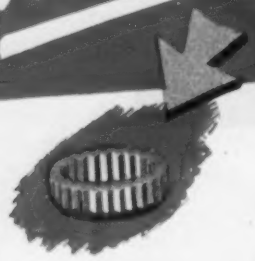

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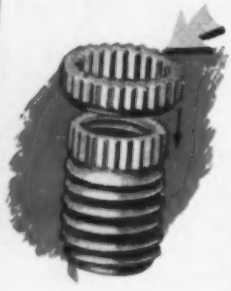

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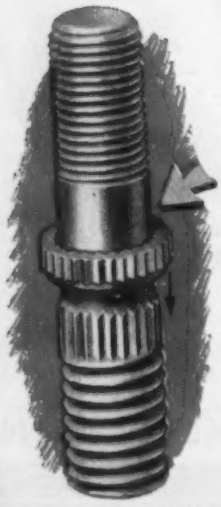

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lurgists and tool engineers is especially emphasized. Many of the test results given in the paper are completely proved and suggest probable causes for premature failure of hardened tools or similar parts. Other statements are partially based on theory, indicating the need for further research in this important field.

Beryllium in Magnesium Casting Alloys

By Jay R. Burns, metallurgist, air materiel command, Wright Field, Dayton, O.

Observations were made on the effect of adding beryllium to magnesium casting alloys. Marked burning inhibition and grain coarsening were noted. Beryllium additions were effective in removing iron and manganese from magnesium. Various grain refining techniques were attempted with partial refinement obtained in some cases. The data permitted the establishment of the relationship between grain size and mechanical properties of AZ92 alloy, solution heat treated.

Metallography of Galvanized Coatings

By D. H. Rowland, research associate, Carnegie-Illinois Steel Corp., Research Laboratory, Pittsburgh

A new metallographic etching reagent for galvanized coatings has been developed. Through use of this reagent, it is demonstrated that the "alloy layer" of galvanized coatings, both experimental and commercial, contains all of the phases shown by the Schramm iron-zinc constitution diagram at the temperature level of commercial coating practice. Thickness measurements, and microhardness values of the various phases are presented. "Alloy layer" structures of coatings made from aluminum-bearing spelter are discussed.

Multiple Correlation Applied

By W. T. Rogers, metallurgical statistician, Lorain Works, National Tube Co., Lorain, O.

This paper presents the application of multiple correlation methods to four different types of problems encountered in a large steel plant. Its purpose is to show the versatility of this type of analysis in its application and to point out the practical results which have been obtained by its uses.

Hardenability of Boron Steels

By G. D. Rahrer, staff metallurgist, metallurgical division, alloy unit, western area, Carnegie-Illinois Steel Corp. and C. D. Armstrong, metallurgist, research laboratory, Gary Steel Works, Carnegie-Illinois Steel Corp.

This paper concerns an investigation to determine the predominant factors influencing the hardenability of boron steels. Hardenability values are based on a comparison of results from end quench hardenability specimens representing 53 boron steels of open-hearth manufacture and companion boron-free steels of substantially the same analyses. Compositions include plain carbon to medium alloy types with carbon contents from 0.12 to 0.95 per cent.

Results indicate that, with boron additions of 0.0006 to 0.0045 per cent, only carbon content and intensity of deoxidation affect the hardenability factor for boron to a demonstrable degree. Considering carbon content, the multiplying factor for boron can be expressed by the formula:

$$F_B - 1 + 1.5\ (0.90 - C)$$

in which F_B represents the multiplying factor, and C, the carbon content. Evidence is presented that steel must be well deoxidized for attaining the potential increase in hardenability from a boron addition.

Acicular Transformations in Alloy Steel

By Edward A. Loria, fellow, Mellon Institute of Industrial Research, Pittsburgh

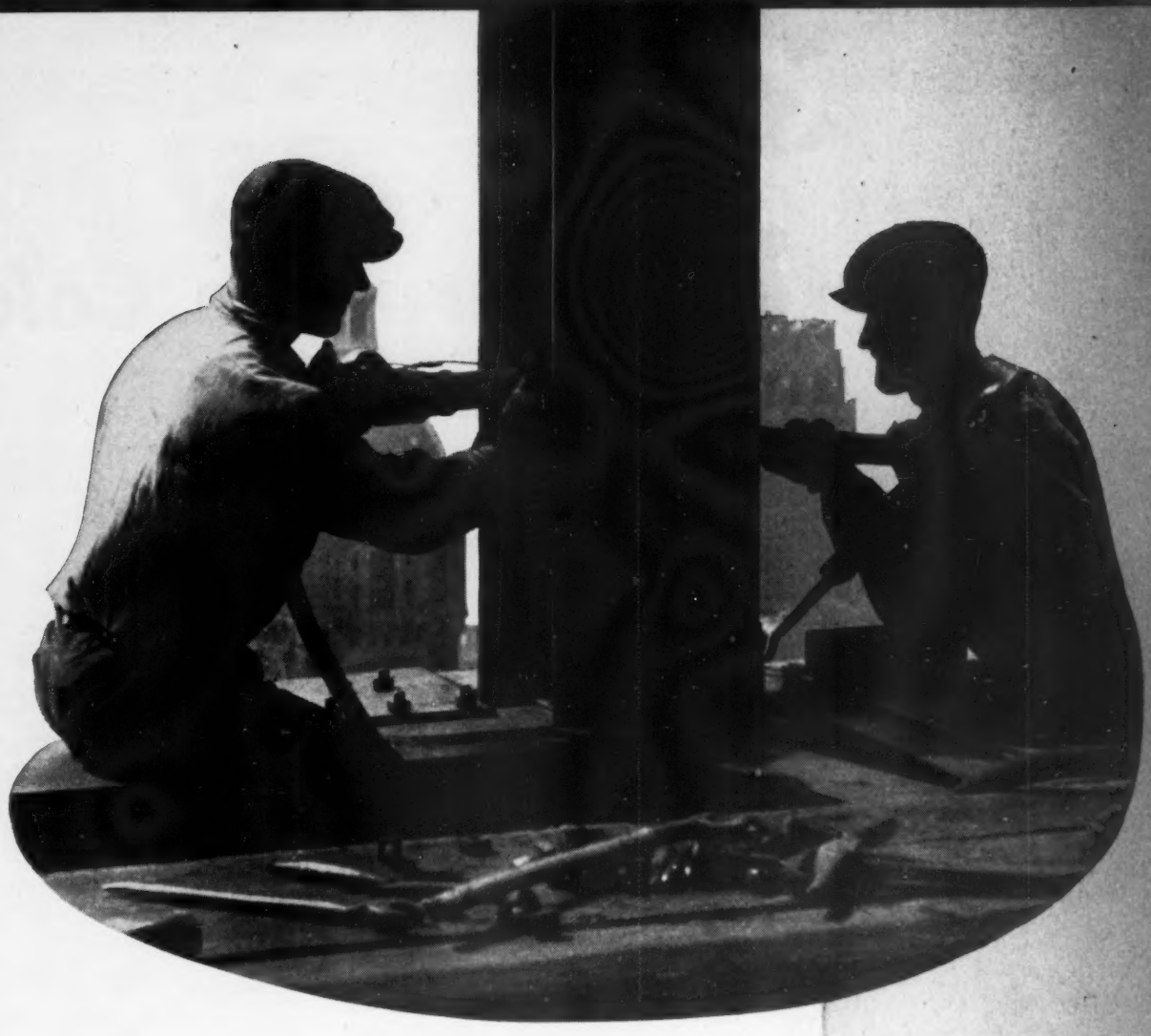
Data of a fundamental nature were obtained regarding the acicular structure occurring within the intermediate isothermal transformation range of two particular alloy steels containing appreciable amounts of a number of carbide-forming elements, sufficient to make one of them (steel A) slightly hypereutectoid below the upper nose of its TTT-diagram. The acicular transformation in this steel is unique in that the primary carbon-rich plate constituent first forms by a lattice shearing process and then undergoes a slow but complete change in structure after long holding periods at temperature.

Results demonstrate that alloy steel A passes through three structural changes on isothermal transformation. The initial precipitate, a carbon-rich plate constituent formed by a lattice shearing process, is really a transition structure which decomposes or tempers in various stages on further isothermal transformation. During the second stage, there is a diffusion of carbon-rich constituent from the outer skin of the plate resulting in the formation of thin fibers and the nucleation of ferrite grains in these areas of the outer skin.

On further isothermal transformation, the diffusibility of the carbon in the skin of the plate will cause the carbon to diffuse out of a growing ferrite grain into the surrounding austenite matrix, where the free energy for carbon is lower. The third stage consists of the complete change to a new type of transformation product — an irregularly shaped ground mass which is a confused aggregate of ferrite and carbide. Subsequent transformation results in the continued growth of these carbide-ferrite aggregates in the remaining austenite. The resulting microstructure is quite similar to the fully developed acicular ferrite obtained in the lower part of the intermediate range in hypoeutectoid alloy steel B.

Nature of the acicular structure in alloy steel B has been studied to determine if a basis of comparison could be drawn with that observed in steel A. In contrast, the primary precipitate is acicular ferrite containing entrapped particles which are revealed as carbide and austenite (martensite on quench). The data show that the primary carbon-rich plate in steel A is really a transition product which tempers in stages on further isothermal transformation into a ferrite-carbide aggregate, resembling the fully developed acicular ferrite obtained in the lower part of the intermediate range in steel B.

"for STRONG
DEPENDABLE JOINTS...
I'll take
BOLTS and RIVETS
everytime!"



WHEN a rivet is driven home tight and true, when the nut on a bolt is drawn up properly—there is no guesswork, no uncertainty about the connection. Joint designs are based upon proven engineering data and the strength of the materials is known; consequently the human element is practically eliminated, and the behavior of the joint can be accurately predicted.

A riveted or bolted structure is a sound structure—and you know it without elaborate inspection. For dependability, security and economy, use FASTENERS!

AMERICAN INSTITUTE
OF BOLT, NUT AND RIVET MANUFACTURERS

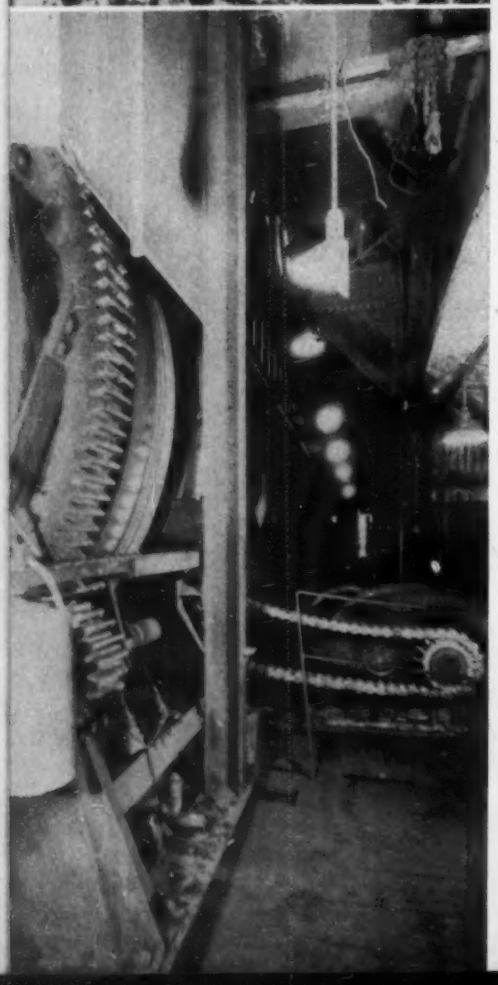
1550 HANNA BUILDING

CLEVELAND 15, OHIO

A NEW FIELD FOR COAL——

Low-Temperature Coke

Any grade of high-volatile coking coal can be used as a starting raw material including the fines and dust accumulating in coal preparation plants. Each ton of coal charges yields approximately 15 gallons of tar. New plant will produce 750 tons of smokeless fuel daily



MANUFACTURE on a commercial basis of its smokeless fuel produced from coal fines will be started early next year by the Disco Co., subsidiary of the Pittsburgh Consolidated Coal Co., Pittsburgh. Included in the company's new plant now under construction near McDonald, Pa. is a tar refinery for the recovery of coal-tar chemicals. About 15 gallons of tar will be produced per ton of coal charged.

The product is heavier than high temperature coke and differs from the latter in a numher of respects that are important in domestic heating use. It is a highly reactive fuel, easily ignited; ash runs from 10 to 11 per cent, and volatile content of the final product from 15 to 17 per cent, which assures both smokelessness and high ignitability. High shatter index is 70 per cent for plus 2-inch material. The balls range in size from 1 to 8 inches diameter. The product is dense, with an apparent specific gravity of 0.85 and is unusually uniform in cell structure.

In addition to the low temperature coke, the process produces tar, light oil, liquor and gas. The light oil is not presently recovered but is burned with the gas, and no effort is made to recover commercial products from the liquors. The tar is passed through a tar refinery for the recovery of the following:

Fig. 1—(*above*) *Storage pile of low-temperature coke made by process described in accompanying article*

Fig. 2—(*left*) *Carbonizer and drive mechanism of a unit built in* 1936, *looking from the charging end. Carbonizer is* 8 *feet diameter,* 126 *feet long and produces* 90 *tons daily*

Tar-acid oil, used extensively for making disinfectants, metal cleaning compounds and reagents for purifying minerals by froth flotation. Production will be over 1,400,000 gallons annually.

Creosote oil, used as a preservative for railroad ties and other wood products. Estimated annual production will be 1,250,000 gallons.

Fuel pitch, used by steel mills and others as an industrial fuel. Annual production: 950,000 gallons.

Pitch coke, a granular coke product used principally in the manufacture of activated carbons. The yield will be some 5000 tons per year.

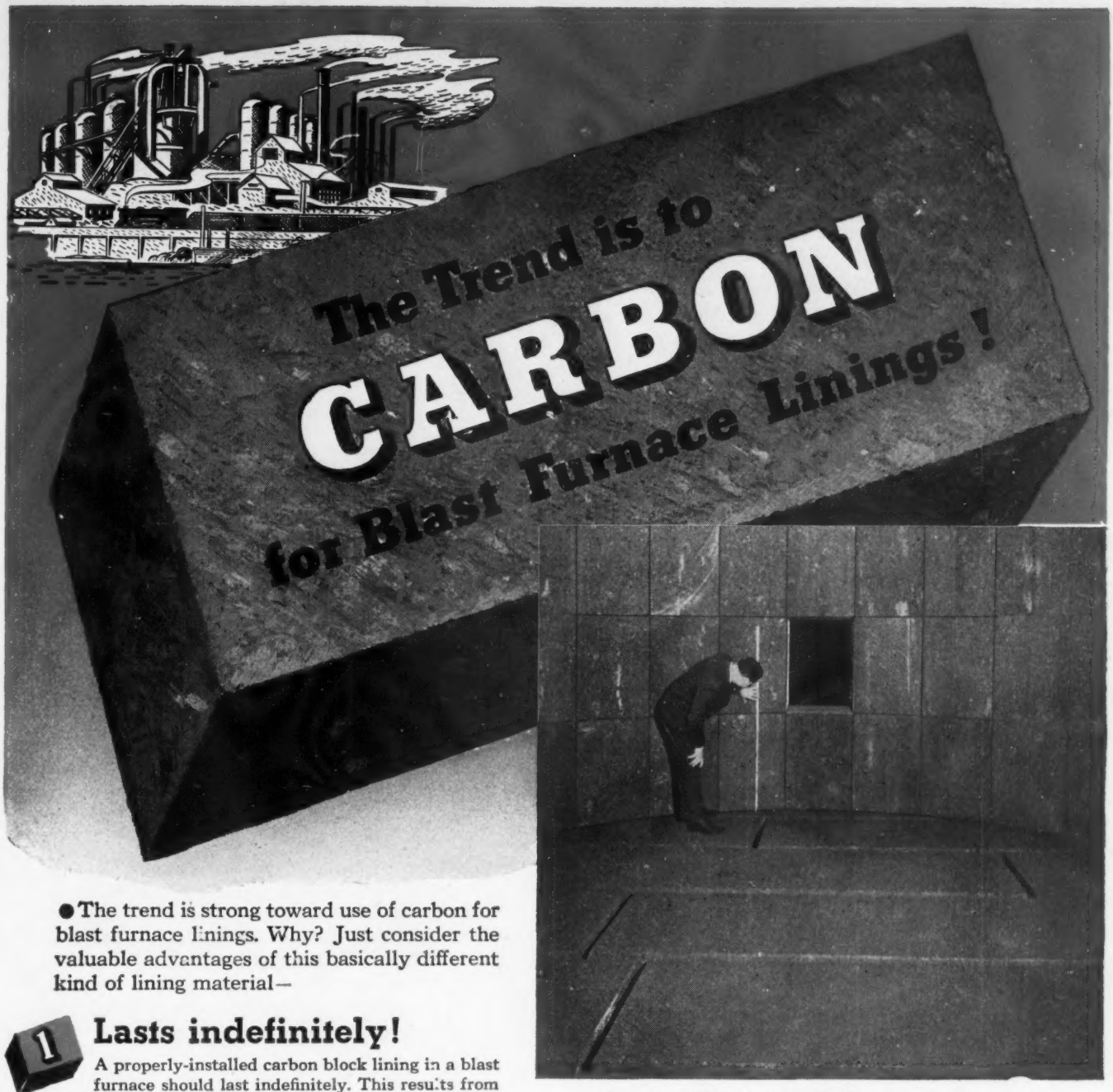
The combination of factors which make the process distinctive include the following:

1. It is a completely continuous low-temperature coke process in every phase of its operation.
2. It succeeds in making homogeneous balls of smokeless solid fuel.
3. It is a two-step process, that is, the raw charge is preheated before it is placed into the distillation retort.
4. It utilizes the waste fines of bituminous high-volatile coal cleaning plants, thereby creating a salvage outlet for what would otherwise be an economic loss of mineral resources.
5. Part of its own product is recirculated through the process in the form of breeze, which acts as an aggregate for the melting coal and imparts strength.
6. The tar by-product is of rich quality, containing a high content of tar acids. The by-product gas furnishes the heat required for the process.
7. The highly reactive radiant fuel is easy to ship, handle, store, ignite and control in combustion.

The Charge: Slack and coal fines in sizes minus ¼-inch are received from the high-volatile coal cleaning plant and stored adjacent to the plant. A conveyor then moves it into a heat drier with capacity of 50 tons per hour. Here temperatures are maintained only high enough to reduce the outside moisture acquired in the coal cleaning process. A conveyor belt carries the dry coal to a charging station near the top of the plant. Here, a proportion of breeze is mixed with the coal and the charge is ready for the preheating operation.

The fine-size breeze is recirculated through the process to facilitate control of the ballmaking, and particularly to improve the structure of the balled product. The effect is much

(*Please turn to Page* 147)



● The trend is strong toward use of carbon for blast furnace linings. Why? Just consider the valuable advantages of this basically different kind of lining material—

1 Lasts indefinitely!

A properly-installed carbon block lining in a blast furnace should last indefinitely. This results from the remarkable physical properties of carbon: no melting point, low thermal expansion, highly resistant to thermal shock, not wet by molten metals, immune to metal and slag attack, mechanical strength maintained at high temperatures.

2 No Salamander!

Years of experience with carbon linings bears this out. Consider what a saving this feature, alone, can mean to you.

3 Fast, easy to install!

One carbon block can take the place of from 50 to 1000 nine-inch firebrick, depending upon the size of the block. Overall installation time is thus greatly reduced.

Interior of hearth lining looking toward iron notch. Blocks may be of any size desired up to 24x30x180 in.

4 Economical in long run!

Operating experience is proving that carbon linings are definitely more economical in the long run . . . as is evident from the features outlined at left.

WHATEVER YOUR PROBLEM — CONSIDER CARBON OR GRAPHITE

Get more details:

Engineers at National Carbon Company, Inc., will be glad to supply you with full available information on all phases of installing a carbon lining. Write today **to Dept. ST.**

NATIONAL CARBON COMPANY, INC.

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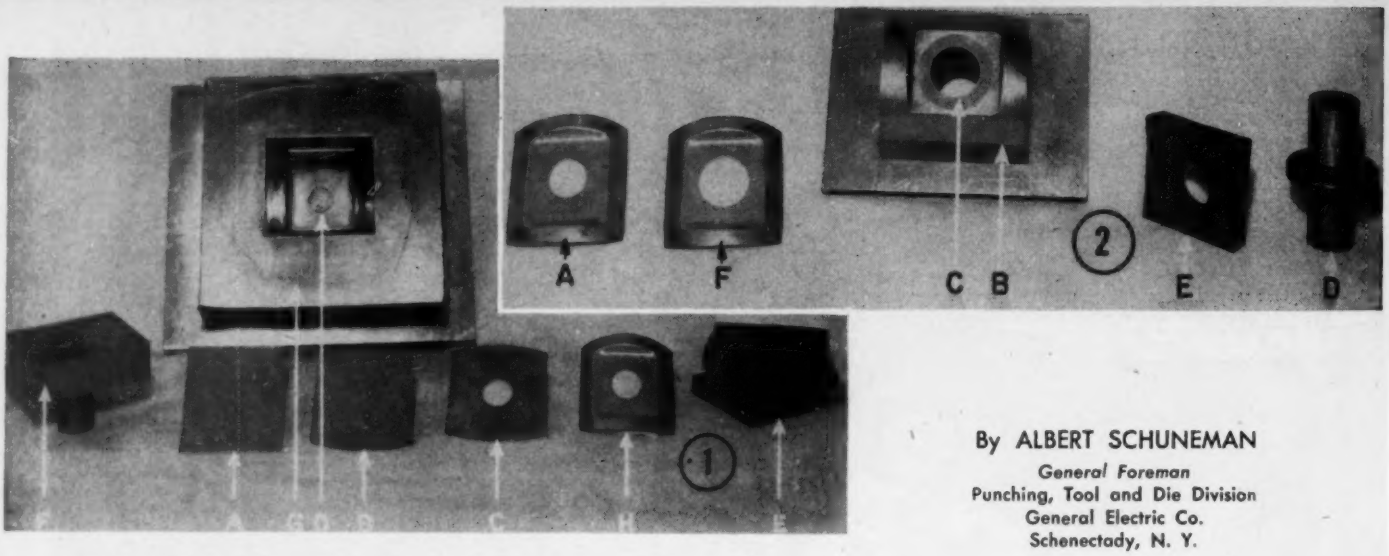

By ALBERT SCHUNEMAN
General Foreman
Punching, Tool and Die Division
General Electric Co.
Schenectady, N. Y.

EFFECTIVE USE OF

Rubber Forming Dies

RUBBER forming dies can frequently be used effectively and economically in operations where considerable accuracy and low cost are required, or where low production does not justify the use of standard-type dies. Typical of the latter is an order recently handled by the Punching, Tool and Die Division of General Electric's Schenectady Works for 200 flange plate supports made of 0.053-inch stainless steel. In view of the small quantity required and the urgent production demand, a soft die using rubber as a forming medium was made.

The form die was run in a 115-ton press. Heavy pressure required for forming the stainless steel affected only the synthetic rubber forming block, which was nearly spent after completion of the 200 parts. A repierce die employing a rubber stripper and a stock pierce punch was used after forming to complete the part. Tools for this job were produced in 2 weeks, at a total labor cost of $180 which included the parts produced. By completing the job in 2 weeks a costly delay in production was avoided.

Figs. 1 and 2 illustrate dies made and sequence of operations in pro-

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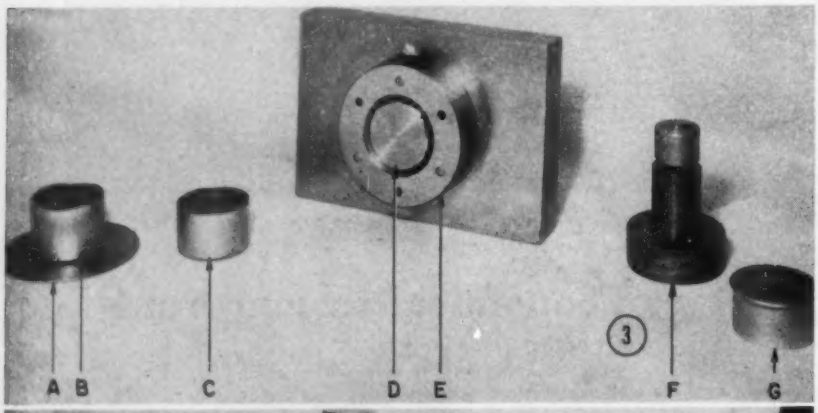


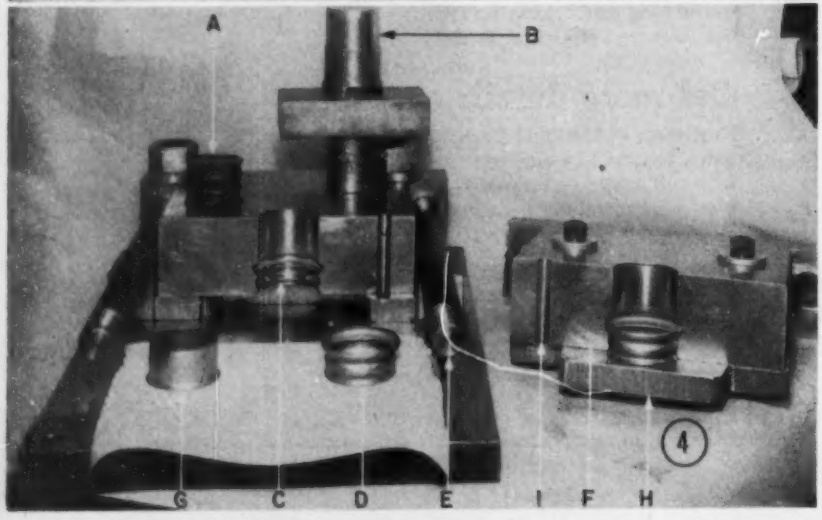
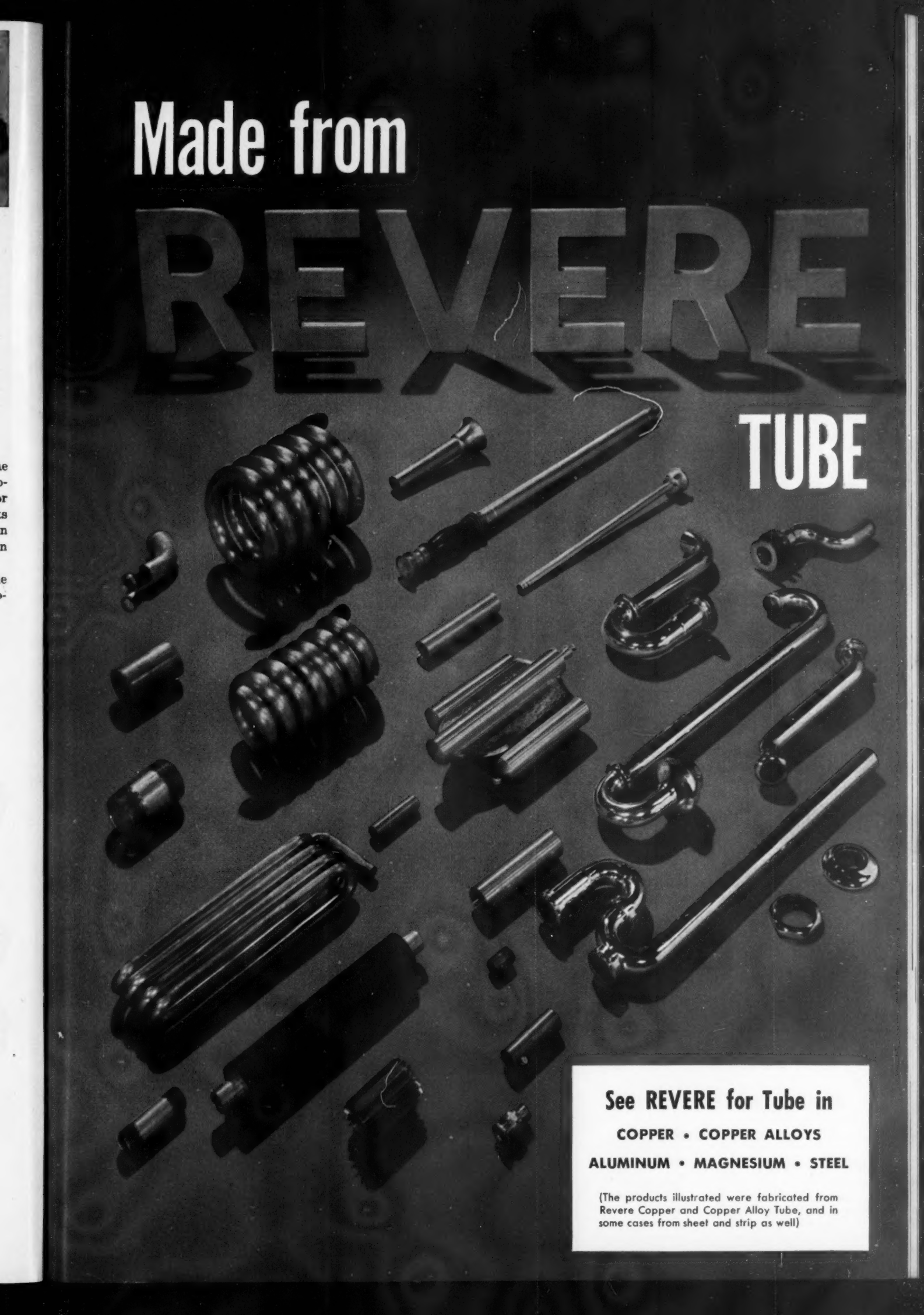


Fig. 1—Form die for flange plate support. A—Stainless steel sheared blank; B—same blank with corners sheared in hand press and ends radiused on grinding disk. C—blank B with 1¼-inch hole pierced in Wiedemann hand press to allow for material flow in form operation; D—forming mandrel; F—pressure punch; E—forming block: 3 pieces, 3/4-inch thick, synthetic-rubber cemented together. G—(Rubber confining) casing; H—Final draw blank

Fig. 2—Repierce die for flange plate support. A—Blank from form die; B—die block; C—die bushing; D—stock punch; E— synthetic rubber stripper; F—final repierced blank

Fig. 3—Die to perform first forming operation on sheeve. A—Blank made from standard stock die. B—Shell made from standard conventional-type draw die; C—same shell as B trimmed to developed height; D—bottom punch also knockout pad; E—tool-steel die ring; F—Top flattening punch with positive knockout rod; G—shell with first bulge operation

Fig. 4—Final form die for sheeve. A—Rubber bulging plug; B—pressure punch; C—form or shape cavity; D—finish formed sheeve; E—clamping studs; F—sliding portion of die; G—shell before final form operation; H—backup plate; I—locating pin for two clamped die sections


Made from
REVERE
TUBE
See REVERE for Tube in
COPPER • COPPER ALLOYS
ALUMINUM • MAGNESIUM • STEEL
(The products illustrated were fabricated from Revere Copper and Copper Alloy Tube, and in some cases from sheet and strip as well)

COPPER REVERE BRASS
Tube is Versatile

. . . RESISTS CORROSION. Revere Copper and Brass Tube have excellent corrosion resistance, which is one, but only one reason why tube of these fine metals is so attractive to industry. Its resistance to most of the corroding factors commonly present in liquids, gases, and air is a big advantage. If your product calls for unusual corrosion-resistance, we can arrange for a Revere Technical Advisor to help you determine the most serviceable alloy for your needs.

. . . IS EASY TO WORK. No matter if your product is simple electrical terminal lugs or complicated oil refining equipment, Copper and Brass Tube simplifies your manufacturing problems. You can easily bend most types of Copper Tube to meet installation needs. If Copper Tube is to be machined, Free-Cutting Copper is preferred. When machining is necessary on Brass Tube, we recommend the use of Leaded Brass Tube for easy and fast cutting. This ease of fabrication speeds up your assembly line.

. . . IS MADE TO CLOSE TOLERANCES. The full wall thicknesses and close gauge tolerances of Revere Tube help to speed up and simplify your manufacturing processes. When you use Yellow Brass or Leaded Brass Tube for machining, you can start with a tube of accurate dimensions and hold to close tolerances at high production speeds because the metal cuts freely and cleanly.

. . . COMES IN SPECIAL SHAPES. In addition to the standard sizes of round tube, Revere Tube can be obtained on order in an almost unlimited variety of profiles—oval, hexagonal, square, or whatever is required. Revere maintains a large stock of different drawing dies and is prepared to make and maintain special dies for individual use.

. . . HAS A LONG LIFE. It gives long service because of its corrosion-resistance and other durability features. You or your mechanics don't have to waste time and money tearing down equipment for complicated repairs and replacements. Consumer products using it enhance your reputation.

. . . REDUCES HEAT LOSS. Copper and Brass Tube carries heated air, liquids, and gases with little heat loss. With Revere Copper Tube for example, the total heat loss due to convection and radiation is about half that for black iron pipe of the same nominal size.

. . . IS A GOOD HEAT CONDUCTOR. Copper Tube transmits heat readily and warms quickly when a warm liquid passes through. This makes fats, grease, and similar substances flow through in a liquid state, reducing any tendency to clog.

. . . REDUCES FLOW RESISTANCE. The smooth gun-barrel interior finish of Revere Copper and Brass Tube allows liquids to flow through it rapidly with minimum friction. When solder fittings are used, there are no projections or recesses to obstruct the flow.

. . . IS AN IDEAL ELECTRICAL CONDUCTOR. High electrical conductivity is especially important to the electrical equipment manufacturer. Revere Deoxidized Copper Tube has a rating of 75-90 per cent. I. A. C. S. electrical conductivity at 68° F., Cartridge Brass Tube has a rating of 28 per cent, and Leaded Brass has a rating of 26 per cent.

. . . REQUIRES LITTLE FINISHING. This tube has a smooth, attractive finish. When it is made into manufactured articles, this reduces polishing and buffing time.

. . . IS EASY TO SOLDER OR WELD. You can solder, weld, or braze Copper and Brass Tube rapidly and economically.

. . . IS EASY TO PLATE. You save money when you make plated parts from Copper and Brass Tube. It is a simple matter to plate the tube with chromium, nickel, silver, gold, rhodium, and many other metals. It is equally simple to apply other finishes, such as paint and lacquer.

. . . IS ECONOMICAL. The ease with which Revere Tube can be made into finished products results in economical manufacture. The user enjoys the ultimate economy of having a long-lived article requiring a minimum of maintenance, which adds to your reputation as a maker of fine goods.

. . . HAS HIGH SCRAP VALUE. Nearly any kind of scrap you make during fabrication of Copper or Brass Tube has a market value. About the only exceptions are filings and dust. Likewise, if you scrap part or all of a Copper or Brass Tube installation due to obsolescence for example, you can realize a favorable return on the metal. These economies are highly appreciated by all experienced users of copper and brass.

THE BIGGEST ADVANTAGE OF ALL IS SUPERIOR QUALITY

The word Revere on a length of Copper or Brass Tube has long been a guarantee of the ultimate in high quality. Generations of manufacturing experience, plus modern production methods, strict metallurgical controls, and frequent inspections ensure that every foot of Revere Tube conforms to the same exacting standards.

THESE THREE ALLOYS MEET MOST MANUFACTURING REQUIREMENTS

REVERE COPPER TUBE—Alloy No. 101 (Deoxidized Copper) (Copper 99.90% minimum, phosphorus 0.025%).

General properties: Revere Deoxidized Copper is extremely corrosion-resistant, has high ductility, welds and solders readily. It is furnished in hard or soft tempers.

Typical uses: Revere Copper Tube is recommended for industrial piping of liquids; compressed air, gas, and refrigeration lines; feed lines and piping in electric power and light plants; locomotive water systems; automobile radiators, heaters, oil lines, brake systems, and gasoline lines.

Working properties: Cold working, hot working, soldering, polishing—excellent. Machining—Free-Cutting Copper preferred. Welding—gas, carbon arc, and metal arc.

ASTM specifications: B13, B42, B68, B75, B88, B111.

REVERE CARTRIDGE BRASS TUBE — Alloy No. 161 (Copper 70%, zinc 30%).

General properties: This is the metal used for shell cases and cartridges in the war. It has the best combination of ductility and strength of all the brasses and consequently it has superior cold working properties. It is hard drawn, stress relieved.

Typical uses: Revere Cartridge Brass Tube is recommended for automobile windshield wipers, warp bars or beams in textile machinery, plumbers' brass goods, fire-fighting equipment, toys, automatic pencils, fishing tackle, vacuum cleaners, electric fixtures.

Working properties: Cold working, soldering, polishing — excellent. Hot working — good. Machining—Leaded Brass recommended. Welding—gas, carbon arc, metal arc, spot and seam welding for thin gauge.

ASTM specifications: B135 No. 2.

REVERE HIGH-LEADED BRASS TUBE—Alloy No. 222 (Copper 67.0%, zinc 31.4%, lead 1.6%).

General properties: Free machining combined with moderate cold-forming ability. It is hard drawn, stress relieved.

Typical uses: Screw machine parts, electrical fuse parts, manufactured articles requiring machining or threading.

Working properties: Cold working—fair. Hot working—poor. Machining—good. Welding—non-leaded brass preferred. Soldering—excellent. Polishing—excellent.

ASTM specifications: B135 No. 4.

REVERE Tube is also made in these metals—Electrolytic Copper, Free-Cutting Copper, Silver-Bearing Copper, Arsenical Copper, Oxygen-Free Copper, Red-Brass, 85%, Muntz Metal, Admiralty Metal, Aluminum Alloys, Magnesium Alloys.

LOCKSEAM TUBE

Revere can supply Lockseam Tube in a wide range of shapes and sizes, and in practically all commercial metals. This tube is extensively used for automotive radiators, casket and grave vault handles, appliance and implement handles, light structural applications, electrical apparatus, and for ornamental purposes.

ELECTRIC WELDED STEEL TUBE

Revere also makes Electric Welded Steel Tube, widely used in the manufacture of parts and products not requiring the high corrosion resistance of copper and its alloys. This tube is supplied in round, square, rectangular, oval, and in special shapes to your designs. It may of course be bent, flanged, rolled, machined and otherwise worked, and can be polished, plated, enameled or painted.

ALUMINUM TUBE

Revere Aluminum Tube is used for furniture, hand and stair rails, for conducting liquids and gases, for refrigeration, and wherever a lightweight, strong, corrosion-resistant tube is needed. Available in 2S, 3S, 4S, 24S, 52S and 61S alloys; 24S and 61S can be furnished either soft or heat-treated; the others annealed or in various tempers.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

•

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.

Air and hydraulic cylinder parts constructed of . . .

Solid Steel Blocks

USING building block principles, Miller Motor Co., Chicago, employs solid steel fabricated parts to increase weight of stationary parts of air and hydraulic cylinder. The simple design permits square block construction instead of the usual circular design of cylinder head and cap, providing efficiences of more than 98 per cent. In addition, a number of these cylinders can be mounted side by side in considerably less space.

Customarily the head of a cylinder and mounting bracket are made in one piece, and the cap and bracket in another. Since there are approximately 12 sizes of bores and as many mounting styles for both cushioned and noncushioned cylinders, some 600 different units are required for these two parts alone. Moreover, as it is customary to offer approximately five sizes of piston rods for each bore, 1200 additional different head pieces are required.

The Miller design requires but one style head and cap for each bore size. When an oversize rod is specified, the standard head is taken from stock and center hole machined larger to accommodate the larger rod, Any of a series of separate steel mountings can be placed on the cylinder, attached to the steel tie rods or welded to the head and cap.

Benefits of separate interchangeable mountings are very real to cylinder users. Mounting allows them to utilize a cylinder in a new application when the original use is no longer required, merely by buying or making the mounting bracket to convert it to the new use. Or it permits a cylinder to be taken from stock or from a less urgent use for replacement in a breakdown emergency without loss of time and consequent loss in production.

Also, it allows design engineers to specify size and quantity of cylinders needed on a new machine early in their design work, so that the purchasing department can place the order and insure delivery when needed. Later, when the machine design is advanced enough to indicate style of mountings required, that information can be disclosed and the cylinders delivered with specified brackets. In this same connection, design changes frequently alter style of mounting bracket required on a cylinder.

Steel Cylinder Parts: Steel parts in an air cylinder are as follows: Head, cap, and retainer machined from hot or cold rolled bar stock; piston rod of polished and ground 85,000 to 110,000 pounds per square inch yield point stress relieved steel hard chrome plated; piston and piston followers of 65,000 pounds per square inch yield point cold rolled steel; tie rods of 85,000 pounds per square inch yield point bar stock; brackets

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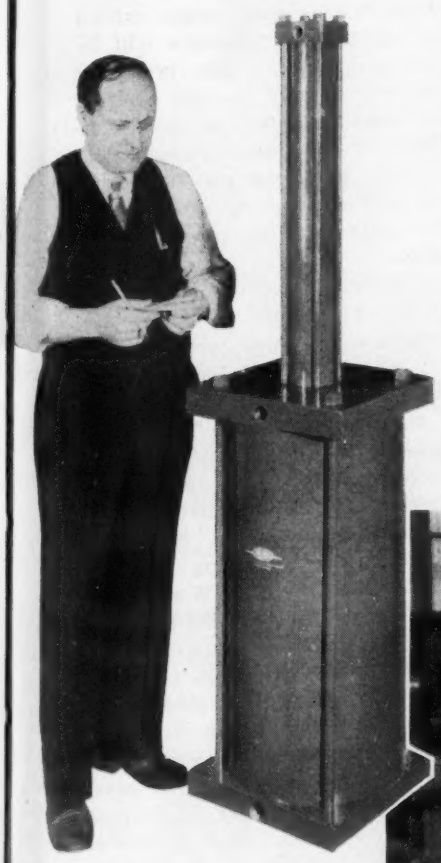


Fig. 1 *(left)—When operated at the air line pressure of* 100 *pounds per square inch, this* 12 *to* 1 *ratio air operated hydraulic unit accumulates up to* 1200 *pounds per square inch hydraulic line pressure. It is used to store hydraulic pressures for applications requring intermittent high pressures and high volume*

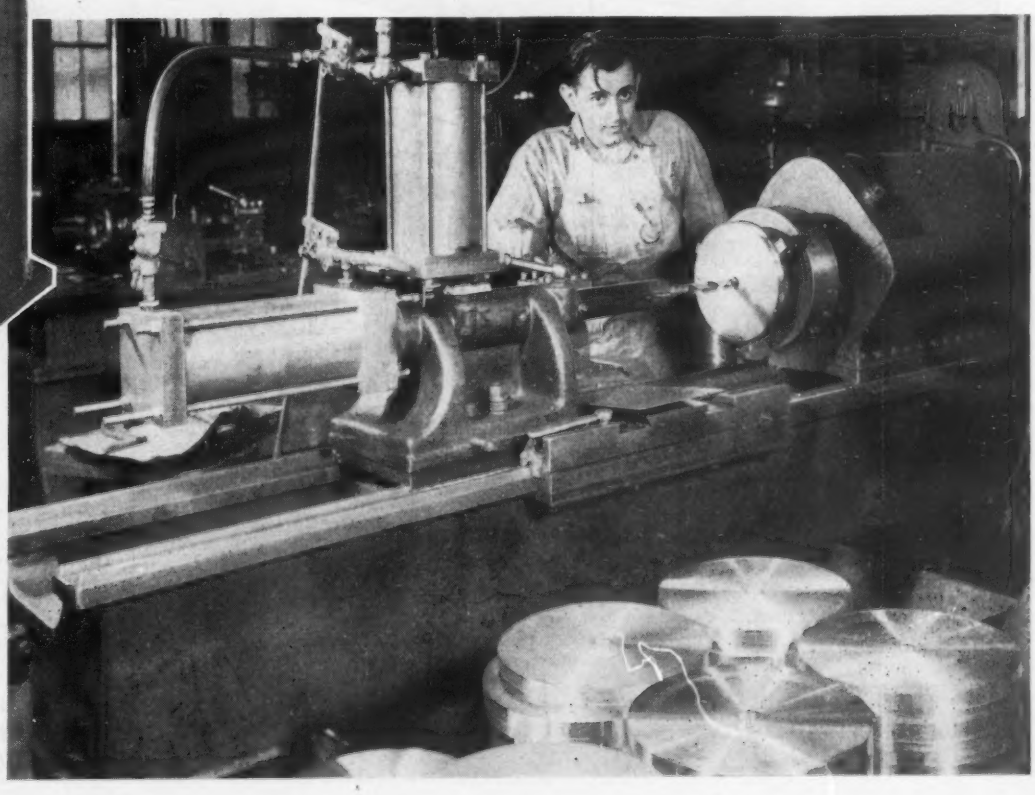


Fig. 2 *(right)—Operated at regular air line pressures, this air-hydraulic lathe tail stock feed provides rapid traverse of tool to work, a controlled feed into or through material, and rapid return*

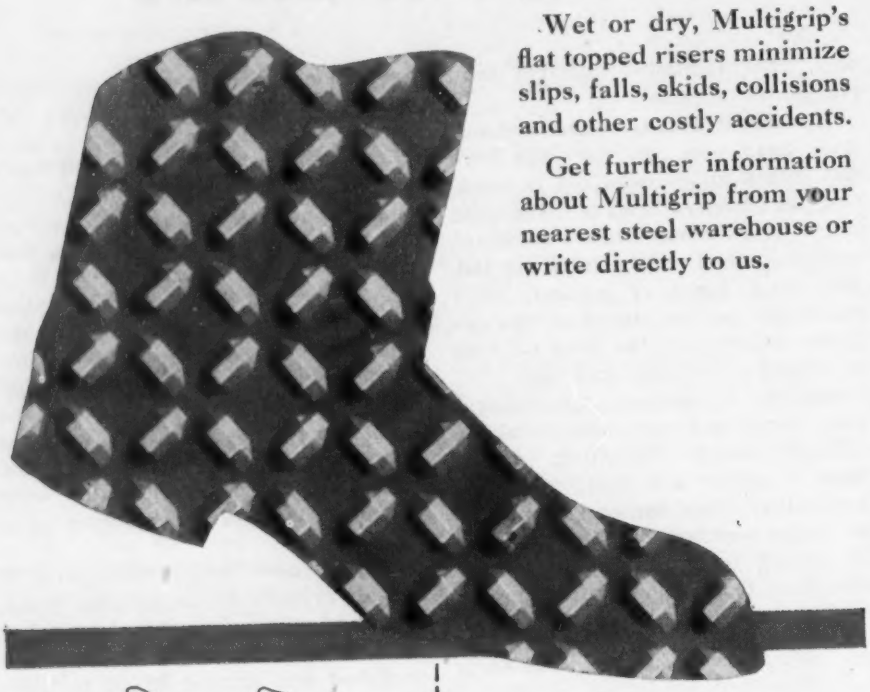
PROTECT

ALL THREE

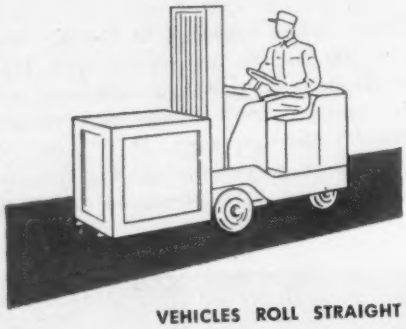
■ MEN walk safe and sure on U·S·S Multigrip Floor Plate. VEHICLES roll straight. FLOORS last longer —are made stronger when covered with this durable steel floor plate.

Wet or dry, Multigrip's flat topped risers minimize slips, falls, skids, collisions and other costly accidents.

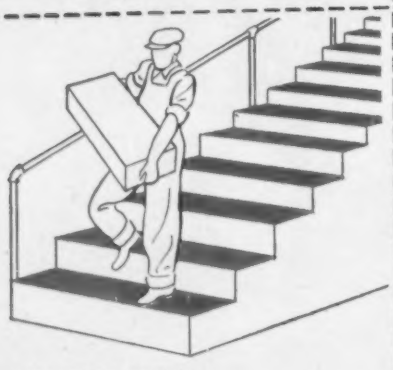
Get further information about Multigrip from your nearest steel warehouse or write directly to us.



FLOORS LAST LONGER



VEHICLES ROLL STRAIGHT



MEN WALK SAFELY

CARNEGIE-ILLINOIS STEEL CORPORATION

USS

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UNITED STATES STEEL

Preview of Metal Congress

(*Concluded from Page* 103)

Lecture which this year will be delivered by Leslie M. Ball of the Naval Ordnance Laboratory, White Oak, Md. The society's annual meeting will follow.

Don M. McCutcheon, Ford Motor Co., Dearborn, Mich,. is general chairman of the meeting which will be headquartered at the Morrison Hotel. Following its annual meeting, the society will change its name to the "Society for Non-Destructive Testing," and its publication to "Non-Destructive Testing."

The industrial gas breakfast, sponsored by the Industrial and Commercial Gas Section, American Gas Association, will be held on Wednesday morning, Oct. 22, at the Stevens Hotel. The association will also sponsor a combined industrial gas exhibit at the Exposition in the International Amphitheatre. Largest single exhibit in the show, 12 companies will be represented therein. The breakfast will be followed by the fall meeting of the Midwest Industrial Gas Council. This organization is composed of men in the industrial gas field from Illinois and neighboring states. Three or four talks will be followed by a luncheon.

The Palmer House will be the scene of this year's special alumni luncheon which will cover about twelve leading technical colleges and universities. These luncheons will be held on Wed. Oct. 22.

Annual Canadian luncheon will be held on Thurs. Oct. 23, also at the Palmer House. Six Canadian chapters of the American Society for Metals will participate including members from Montreal, Ontario, Western Ontario, Ottawa Valley, Manitoba and British Columbia chapters.

In view of the great amount of interest shown in the first ASM metallographic exhibit at the convention in Atlantic City last fall, a similar display is planned for this year's show. A prominent area is set aside at the International Amphitheatre for this display purpose. The display will be sectionalized under 11 classifications of micros, with a blue ribbon first prize in each classification. In addition a grand prize, in the form of an engrossed certificate and a money award of $100, will go to the exhibitor whose work is adjudged "best in show."

The Exposition will open at noon on Oct. 18 and for the first 5 days will close nightly at 10:30 p.m. On Thur. and Fri. Oct. 23 and 24, exhibits will be open at 10 a. m. and close at 6 p. m.

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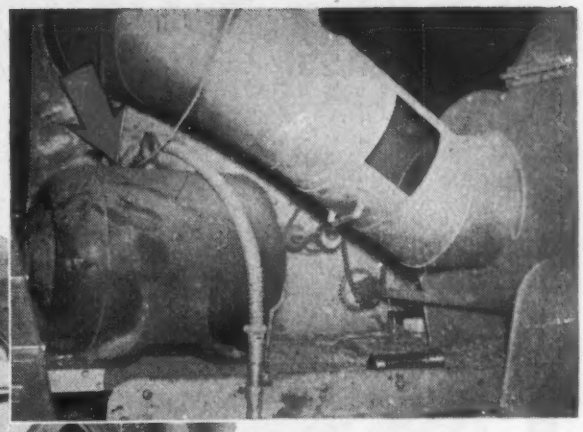
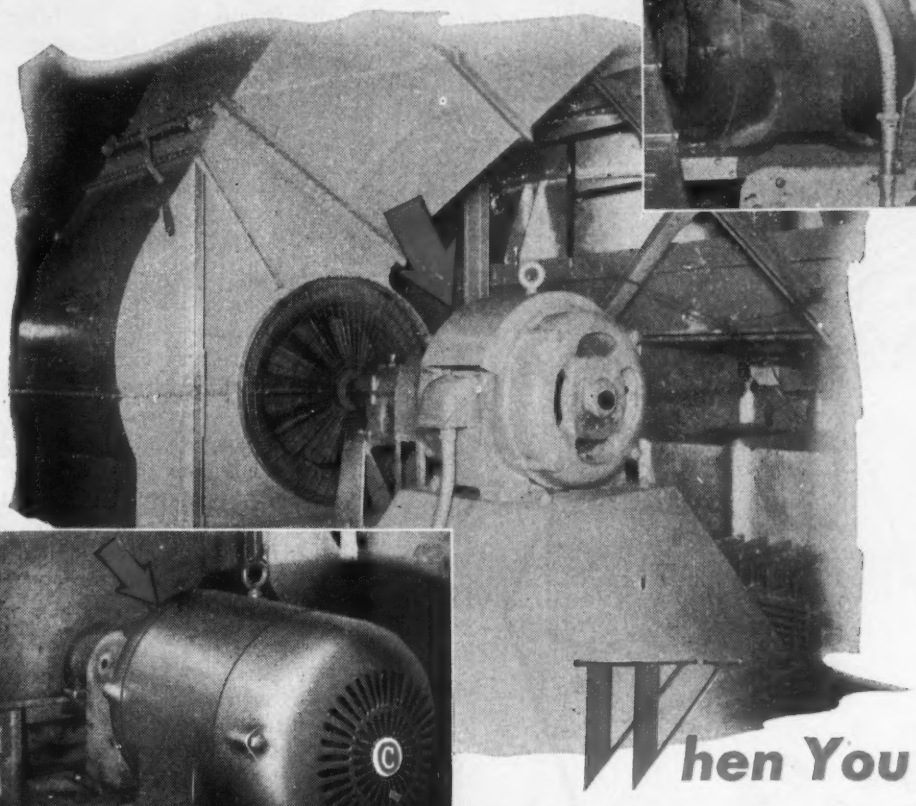
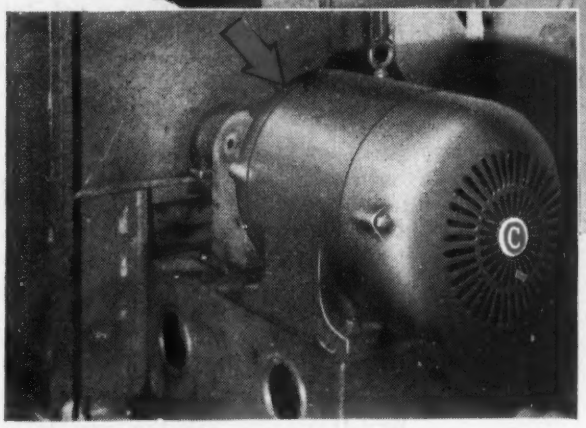


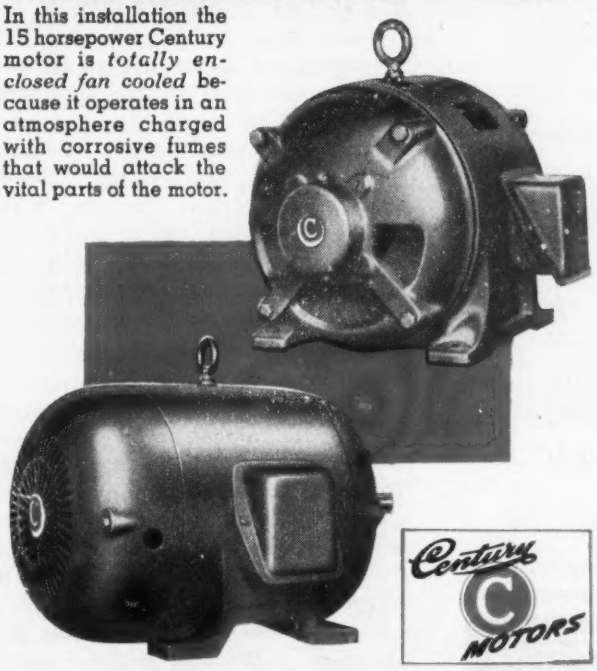
This 5 horsepower Century motor operates a conveyor in a grain elevator in an atmosphere charged with explosive dust.



Because this Century 200 horsepower motor operates a blower in the boiler house of a large generating plant it is *protected from falling objects* and dripping liquids.



In this installation the 15 horsepower Century motor is *totally enclosed fan cooled* because it operates in an atmosphere charged with corrosive fumes that would attack the vital parts of the motor.



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Austenitic Manganese Steel

(*Continued from Page* 100)

internal surface and a higher energy potential.

Hardness numbers of these specimens also confirm this; the large grained one only attaining M-40-45 and the cold reduced one M-53-57. Grain size of the austenite, therefore, is an important factor in the amount of gamma transformed to alpha phase in a given time, but the size of the austenitic grains has little if any effect on the size of the alpha phase mosaic elements.

In the discussion of this problem, it was pointed out that cold working prior to tempering for a prolonged time below A_3 should have a strong influence on the amount of alpha phase and carbide phase transformed in a given time. To illustrate how the x-ray method can be used to follow these changes a pair of specimens were processed as follows, one was cold rolled from 0.118 to 0.050-inch while the other was not cold rolled. The cold reduced specimen was tempered at 900°F for 27½ hours, while the other was tempered for 48 hours.

Hardness Decreases

It was found that the hardness of the cold worked specimen dropped from M-65-68 to M-59-62, but the other increased from M-24-27 to M-42-47. Both tested strongly magnetic, but the cold rolled piece was most magnetic, in spite of the fact that the cold reduced specimen was only heat treated for half the time.

X-ray diagrams of this pair of specimens are shown in Figs. 6c and 6d; they clearly reveal the difference in amount of alpha phase transformed. The cold reduced specimen certainly has the stronger alpha phase lines. Carbide lines are visible on the x-ray film, but it is difficult to reproduce all the lines. Both carbide and alpha phase are magnetic so each contributes to the intensity of magnetication and to the hardening effect.

It should be observed that the lines due to the alpha phase are quite broad in both of these x-ray patterns. This is interpreted to mean that the particle size of the transformed phase is quite independent of the size of the austenite grains from which it transformed.

It was interesting to find that the hardness of the cold reduced specimen was reduced while the other was increased. In this instance at least the hardening due to transformation

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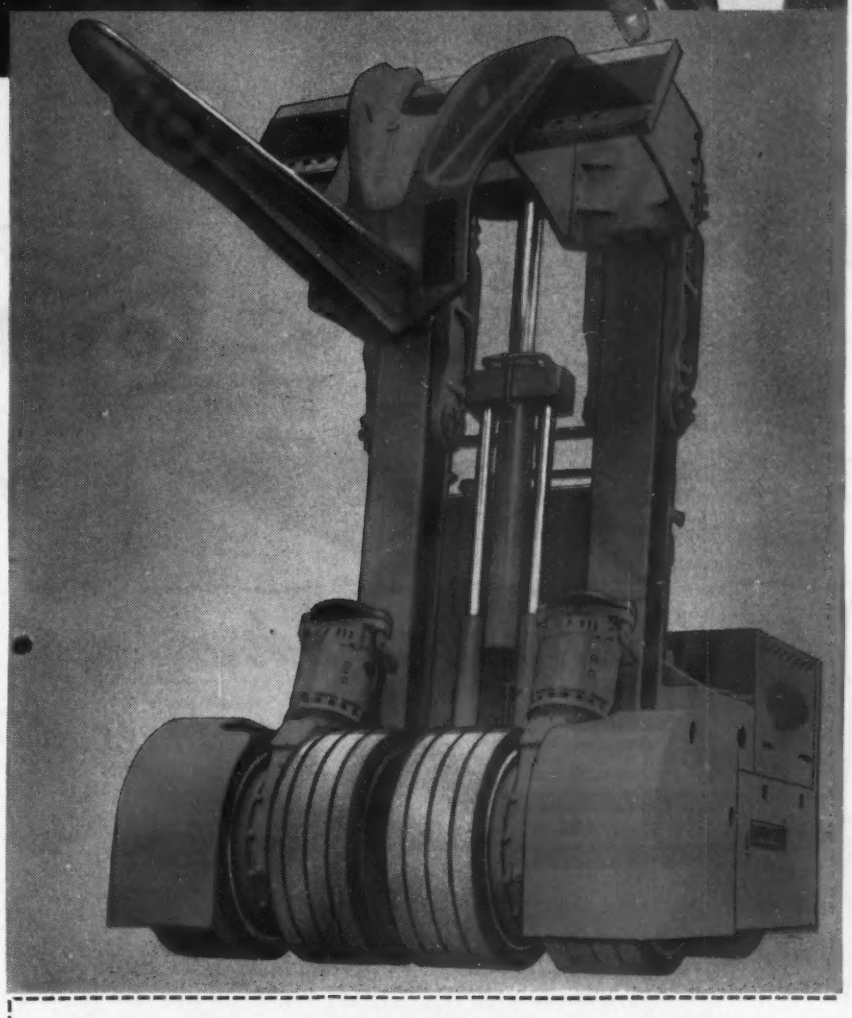

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was not as great as that due to the plastic deformation of the gamma phase. Hardness increase is considered to be due to the smallness of the particle created either by cold working or by transformation.

A set of x-ray diffraction diagrams were made of a specimen given a double heat treatment, the first being at a higher temperature than the second. Would the transformation continue if the second tempering were at a lower temperature than the first, and what effect would it have on the hardness?

Alpha Phase On Pattern

A specimen was heated to 1875°F for 45 minutes and water quenched. The monotron hardness was 26, and the x-ray surface diffraction diagram was, Fig. 7a, characteristic of austenite. The structure was a mixture of large and small austenite grains. After heat treatment at 1100°F for 48 hours, the patterns characteristic of Fig. 7b were obtained. The alpha phase is indicated on the pattern. Some very faint tlines due to the carbide phase could also be seen on the film but cannot be reproduced on the reprint. Hardness increased from M-26 to M-37-40, a very substantial increase. This is believed due to the finely dispersed alpha phase and carbide in the austenite.

This same specimen was again heat treated at a lower temperature, 900°F for 24 hours; the x-ray diagram, Fig. 7c, gave a pattern with more intense alpha phase lines.

A comparison of Figs. 7b and 7c clearly shows this to be true. This may mean that the alpha phase transforms more readily at 900°F than at 1100°F? In fact the x-ray diagrams made of specimens transformed near 1000° F seem to indicate that more alpha phase is precipitated at this temperature. Why should 900-1000°F be more favorable than 1100°F?

In this experiment the effect of air quenching from above A_3 on the cold rolling was studied. Also the possible alterations in the crystal structure were investigated.

A small specimen of hot rolled strip was heated to 1800°F for 1 minute and air cooled. Because of its size, it cooled quite rapidly, and the hardness value M-28-30 was a little above that of water quenched material. Increase in hardness must be due to some phase change during cooling from above A_3. The x-ray diagram, Fig. 8, gave a pattern having strong lines due to the gamma phase and several weaker lines of the alpha

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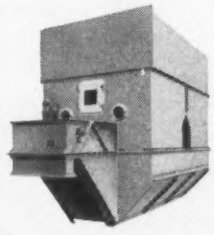

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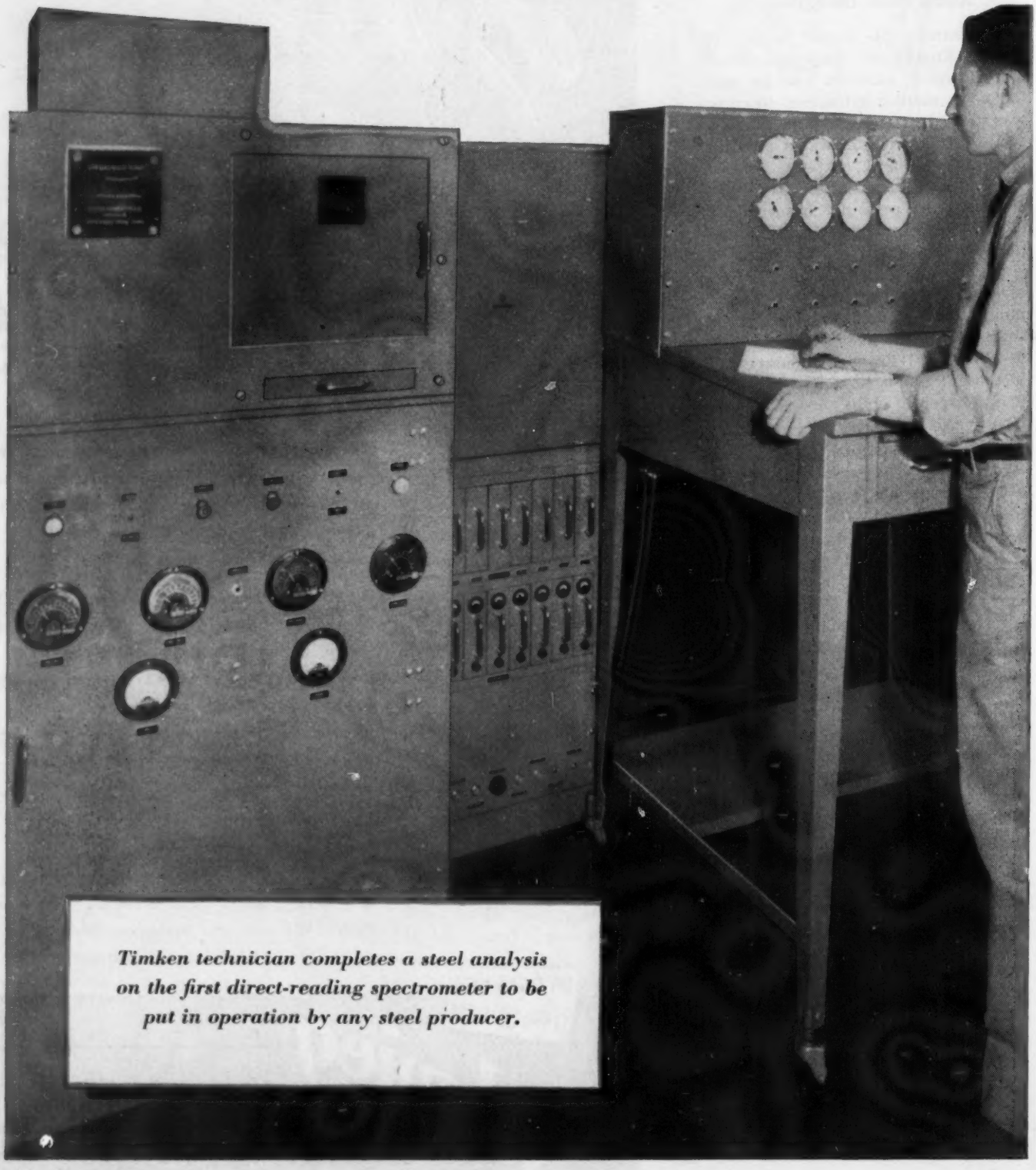

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phase. Carbide lines could also be seen. A slower cooling rate through the critical favors the precipitation of the carbide phase and transformation of some alpha phase.

While it was possible to cold roll this material to some extent, several of the specimens laminated and all developed several edge checks deep enough to cause fracture in some instances. Capacity for plastic deformation is therefore impaired when enough alpha phase is present. Whether the carbide phase impairs the capacity for plastic deformation remains to be determined. When this material is quenched from above A_3 in water, the softest condition is realized. In spite of such a drastic cooling rate, one finds by means of x-ray diffraction that the crystals are quite perfect in structure[1] (p. 626) in spite of this drastic cooling.

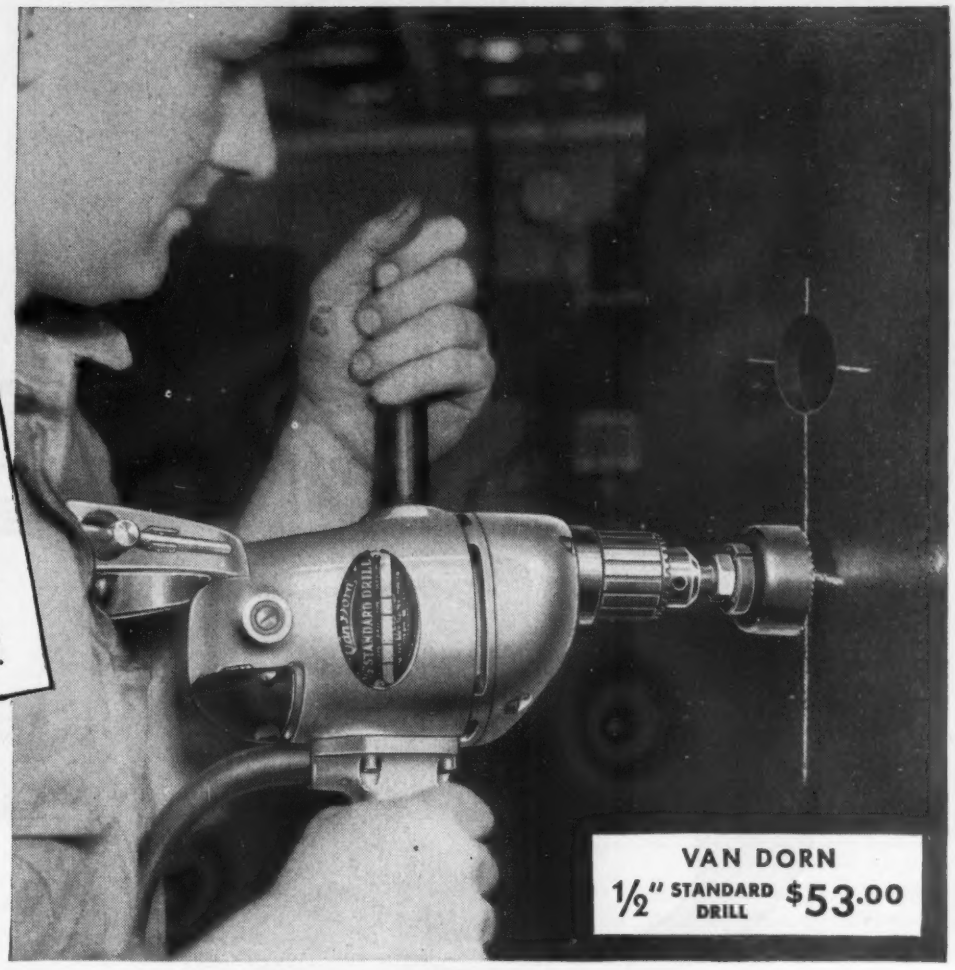
Effects of Cold Reductions

Suppose now that a specimen in its softest condition is given small successive cold reductions, what effect does this have on the structure of the diffraction lines? This should yield some very interesting data in that this steel work hardens so rapidly that even a small reduction by cold working increases the hardness a surprising amount.

Fig. 9a is the x-ray spectrum of the steel in its softest condition. One can see that the lines are quite sharp and the K_α doublets are resolved. This can only mean that the mosaic elements which compose a grain are quite large and the block dislocations are not large, that is, the angular deviation from block to block is quite small.

What happens to the grain structure when this material is given an area reduction of but 8 per cent is exhibited in Fig. 9b. Notice how the individual spots have completely lost their identity, and the K_α doublets are not as sharp as in the as quenched specimen. In light of our present limited knowledge of what goes on in a metal when it is plastically deformed, the grains are: 1. Fragmented into smaller mosaic elements which are measured by the increased diffuseness of the K_α doublets; 2. since the mosaic elements have suffered dislocation and now deviate further in angular displacement from each other within the austenite grains, the individual spots no longer appear. In other words the mosaic element structure rather than the grain itself is exhibited in the diffraction pattern.

When this specimen was cold re-



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duced from 0.115 to 0.106-inch (8 per cent) in thickness, hardness increased from M-23-26 to M-30-35. This increase can be accounted for from the x-ray diffraction pattern. This shows that cold rolling only a small percentage introduces a tremendous fragmentation and dislocation of the mosaic elements.

Next diffraction diagram, Fig. 9c, was made after the specimen was given a total reduction of but 15 per cent (0.115-0.098-inch). This amount of cold working increased the monotron hardness to 40-45. Deformation has caused further fragmentation of the mosaic elements. The diffraction lines have been diffused to such an extent that the K_α lines are no longer resolved and the intensity of the higher order lines greatly reduced.

Mosaic Element Size

This is due to reduction of size of mosaic elements composing the grains of austenite. It was shown in a previous paper[8] that a low carbon steel given a reduction of 95 per cent in thickness failed to diffuse the K_α doublet of molybdenum radiation, that is, the K_α doublets were resolved but of reduced intensity. Therefore, the mosaic element size is related to line width and intensity.

In the case of the Hadfield steel a reduction of only 15 per cent was required completely to diffuse and cause the K_α doublet lines to overlap. In fact the monotron hardness of low carbon steel rolled to its maximum hardness is only M-30-32, and the Hadfield steel rolled but 8 per cent attains about the same hardness. A comparison of the x-ray diagrams of these materials rolled to the same hardness give quite similar x-ray patterns. One may conclude that the hardness developed by plastic deformation is largely a matter of particle size (mosaic element) developed during cold rolling, the smaller the limiting particle size the harder the metal. Chemical composiiton of Hadfield manganese steel favors a very small particle size when this material is cold worked.

Prolonged heat treatment of these steels at 1200°F and higher was also studied. A specimen was heated to 2200°F for 1 minute and water quenched. The x-ray diagram of this was characteristic of austenite, Fig. 10a. After heat treating at 1200°F 48 hours (air cooled), one can see, Fig. 10b, that an appreciable quantity of carbide precipitated from the austenite plus a small amount of alpha phase. The hardness value of this specimen did not change. Ap-

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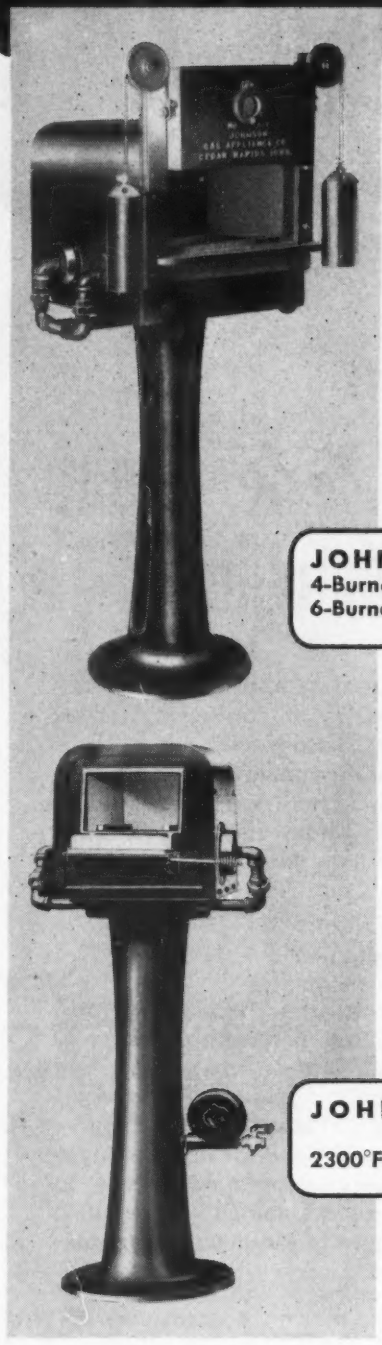

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parently the carbide phase may not always affect the hardness. This specimen could not be cold rolled. It split in several places on the first pass through the mill. Note also that the carbide is fine grained.

Two other quenched materials were heat treated at 1200 and 1300°F for 24 hours, respectively. The x-ray diagrams, Figs. 10c and 10d, have strong gamma iron and well developed carbide lines. The one heat treated at 1200°F has some alpha phase, while the one heat treated at 1300°F has no alpha phase.

Temperatures above 1200°F favor the precipitation of the carbide phase while tempering below 1200°F favors the alpha phase. This is in agreement with the phase diagram already referred to[7]. However, one can appreciate that the x-ray method gives the relative percentage of each phase plus the state of aggregation which is so important in controlling the hardness of metals.

Delayed Quenching Effects

The effect of delayed quenching on the crystal structure and the cold working properties was also studied. Material was prepared as follows: Hot rolled strip was cut into specimens ½ x 0.118-inch and heated to 1850°F, held at temperature for 5 minutes and then permitted to cool to 1500°F in 11 minutes without leaving the furnace. Some were quenched in water and a few in air from this temperature.

The x-ray spectra are shown in Figs. 11a and 11b, the former being water quenched and the latter air quenched. Water quenched specimen was fine grained and the air quenched specimen was large grained. In spite of difference in grain size, hardness was about the same monotron 22-25. Apparently the hardness is not only a function of size of austenite alone, but depends to some extent on the size of the mosaic elements composing these grains, a factor not often considered important or ignored entirely at the present time.

But this concept is slowly being recognized as important. The inner structure of grains[1, 9] is important and much remains to be learned. No doubt some important physical properties of metal and alloys are related to the properties of the mosaic elements especially at elevated temperatures. Aside from the difference in grain size, both were found to be nonmagnetic by an Alnico magnet. This means that these specimens remained austenitic. These specimens

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The banyan tree is the busiest tree there is. Where ever its branches touch the ground they take hold, and the banyan finds more of itself in business. There is a parallel between the banyan and the MOUNT CLEMENS METAL PRODUCTS CO. We started in making clinch-on-nuts for the automotive industry. We sold in excess of 500,000,000 last year. News of our products got around; we touched new markets, and took hold—we found "more of ourselves in business". Because our clinch-nuts hold nuts in place during assembly, particularly in inaccessible spots, they have solved many assembly problems. Manufacturers of automobiles, stoves, refrigerators, stokers, kitchen utensils and many others declare that our clinch-on-nuts are the answer to a cost man's dream. We haven't begun to break down all the possibilities involving the use of our fasteners, clips, small stampings or other items in this field. If you have a problem concerning these assembly headaches, our research and engineering departments will be glad to pitch in and help. For your further instruction and guidance we have prepared an engineering hand book, which covers our complete line of nuts. You may have this book on request.

CMP

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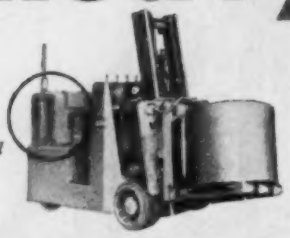
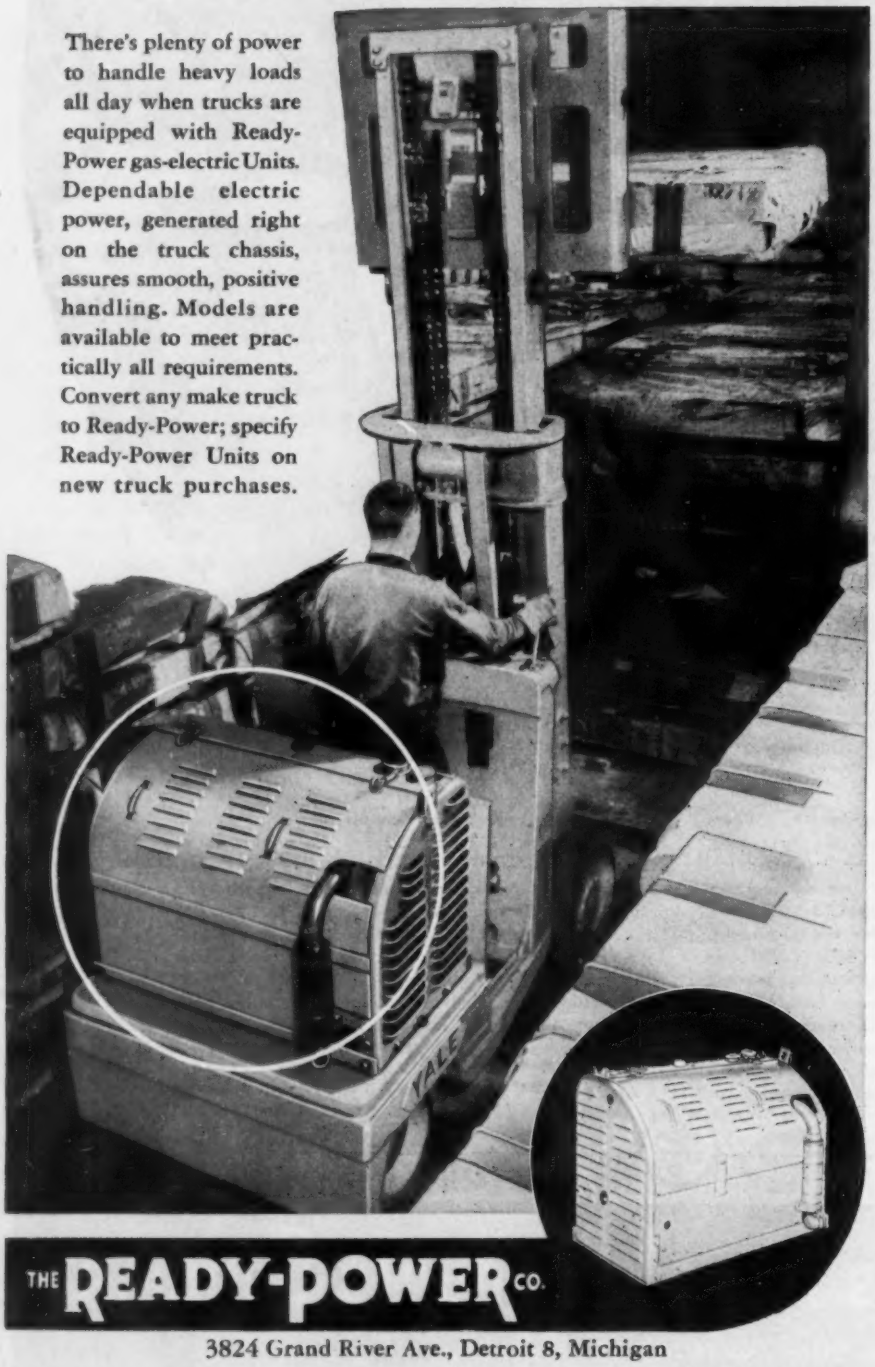
Mount Clemens, Mich.

heavy loads need READY-POWER



Ready-Power-equipped Baker truck

There's plenty of power to handle heavy loads all day when trucks are equipped with Ready-Power gas-electric Units. Dependable electric power, generated right on the truck chassis, assures smooth, positive handling. Models are available to meet practically all requirements. Convert any make truck to Ready-Power; specify Ready-Power Units on new truck purchases.



THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

could be easily cold rolled in spite of the delayed cooling, and in spite of the fact that some were air quenched. In fact these seemed to roll much easier than those quenched from above A_3 the conventional way. Why? Absolutely no edge checking developed during cold rolling.

Further research may lead to the conclusion that delayed quenching may actually improve the capacity for plastic deformation by cold working. The results reported here are only to be regarded as an indication.

Part Removal from Welder Aided by Air Cylinders

A stroke of approximately 4 inches on twelve 3-inch, nonrotating air operated cylinders is used to retract lowered mandrels to permit removal of an automobile part after assembly by spot welder. The foot mounted, double acting type valves, made by Anker-Holth Mfg. Co., Port Huron, Mich., are used by an automobile manufacturer in conjunction with a Progressive 100-kilovolt ampere ultra-speed spot welder for automatic assembly welding of rocker panels and side sills to the floor pan.

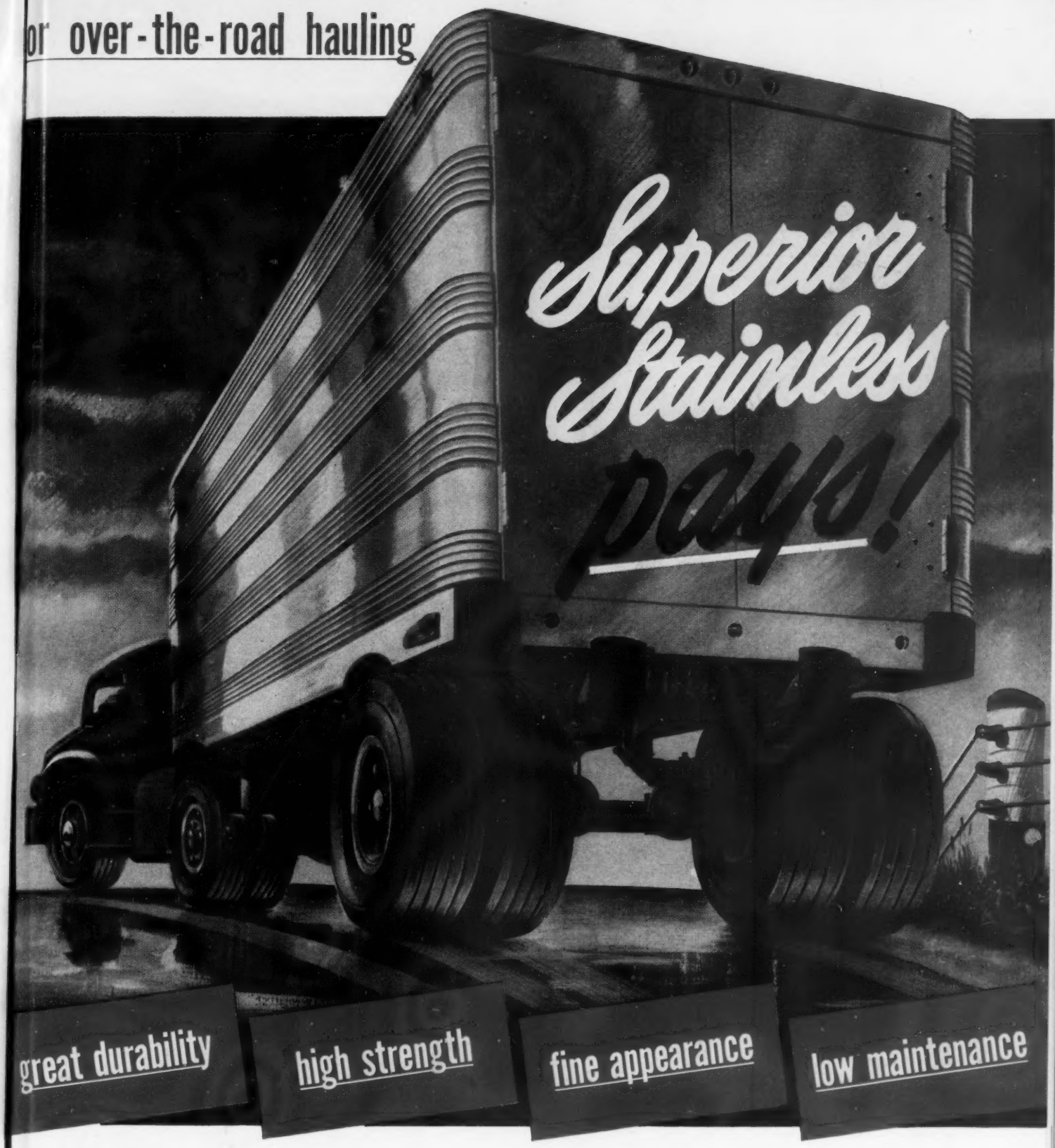
Cylinders are equipped with one-piece piston which permits replacement of packings with a minimum of effort, the company states. Graphite treated packings and expander rings are said to take up wear automatically by the pressure within the cylinder. Extra heavy wall construction reportedly withstands abusive handling.

SAE Issues New Specs

Fifteen new specifications and four revisions of former specifications for aeronautical materials have been prepared by Society of Automotive Engineers Inc., 29 West 39th St., New York 18. Issued as of September 1, the new specifications are available in loose leaf form to supplement those previously issued, along with a new index of all aeronautical material specifications.

—o—

Acme Steel Co., Chicago, will demonstrate two models of the Acme Morrison metal stitchers at the National Metal Exposition in Chicago, October 18 to 24. These machines are designed to stitch metal to metal, or to nonmetallic materials, such as rubber, asbestos, leather, etc. It is reported that no prepunching or cleaning of parts to be stitched is necessary as the wire punches out a clean slug as the stitch is driven. Stitches are formed from a continuous length coil.



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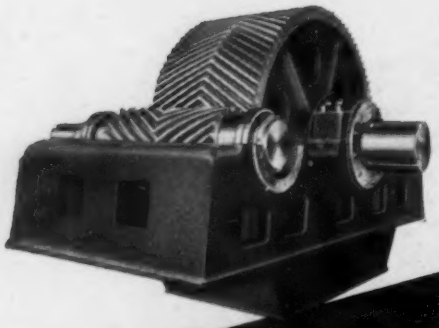
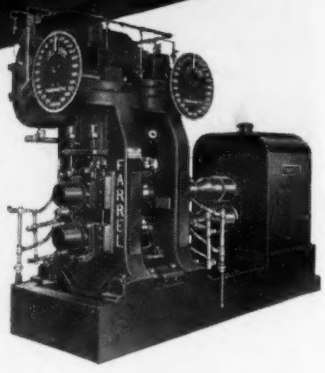


REDUCTION GEAR DRIVES—Designs include single, double and multiple reduction units, in a wide range of ratios and capacities. Continuous tooth herringbone gears — *The Gear with a Backbone* — precision generated by Farrel-Sykes process, provide extra load-carrying capacity and smooth, quiet operation.

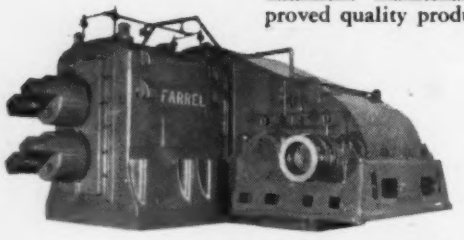
FARREL MILL EQUIPMENT

Engineered for Long Service

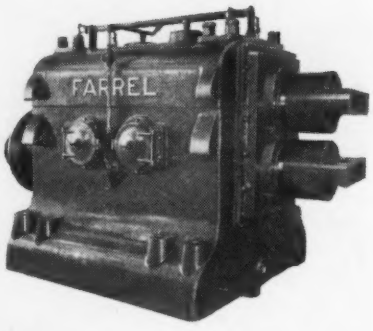
Farrel design gives you rolling mill equipment with operating stamina. At every vital point in each unit you find engineered protection which minimizes wear and preserves dependable performance. A few typical units are illustrated on this page. Information about them or similar units designed to fit your special requirements will be sent on request, without obligation.



ROLLING MILLS — Built in a wide range of sizes for non-ferrous rods, strips or sheets, metal foils and cold strip steel. Complete rod mills from furnace to coilers. Advanced design features contribute to efficient operation, high output, minimum maintenance and improved quality products.



COMBINATION DRIVE UNITS — Include reduction gear drive and pinion stand in compact, integral unit. Designed to withstand the shocks, stresses and wear encountered in continuous, heavy duty service.



PINION STANDS—Double or single helical pinions mounted in sleeve or roller bearings, carried in heavy cast cases, and provided with automatic lubrication. Designed for the job and built in any size and capacity.

ROLL GRINDERS—Built in two types—HD with traveling wheel, and TT with traveling work table—to take maximum diameters from 24" to 60", any length required between centers. Both types grind straight, concave and convex rolls, also shafts and other cylindrical work. Design features insure high quality work, precision and maximum output.

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- Flexible Couplings
- Roll Grinding Machines
- Roll Calipers
- Lead Presses for Pipe or Rod

FB-396

Farrel-Birmingham

Low Temperature Coke

(Continued from Page 124)

the same as results when sand and gravel are mixed with cement to make a strong concrete.

The Preheat: Individual feeding devices measure the mixture charged into rectangular-shaped hearths or "roasters" for the preheating operation. These roasters are of the multi-deck type.

Actually, the two lower decks or hearths of each roaster are used to accommodate the need for an intermediate storage operation. But it is an active rather than static kind of storage, with the charge in motion and maintained at full preheat temperature. The coal is pushed along through the upper level of the roaster by rabbles on crossbars attached to conveyor chains. The trip through the upper roaster requires about two hours, which completes the preheating cycle, during which the charge is brought to and held at a temperature of 600 degrees Fahr. At the discharge end of the upper hearths, the rabbles take on the function of buckets and then convey the preheated material through the lower or storage level in the opposite direction, the 600 degree temperature being maintained.

The heating gases are in closed ducts below each hearth, with the cast iron plates of the hearth resting on the ducts. There is no direct contact between the coal and the heating gases, which as a by-product of the coal, are used as fuel in a furnace to heat the carbonizers and then move on to preheat the charge.

Carbonization: An automatic feeder measures a constant volume of the roasted charge of coal and breeze from the storage hearth to the retort or carbonizer. Each of the seven carbonizers are inclined rotating steel cylinders or kilns, 9 feet diameter and 126 feet long. Surrounding each rotary cylinder is a steel shell insulated on the outside. The charge is received at the upper end of the cylinder, where the distilled vapors and gases are also removed, and the finished product is discharged at the lower end of the kiln.

Heating gases are received from a furnace at the lower end of the carbonizer and pass through the annular space between the outer stationary shell and the rotary retort, thus heating the revolving element. Since the flow of the gases is under pressure and at high speed, the shell of the revolving element is rapidly heated and has a uniform differential in temperature between the charging

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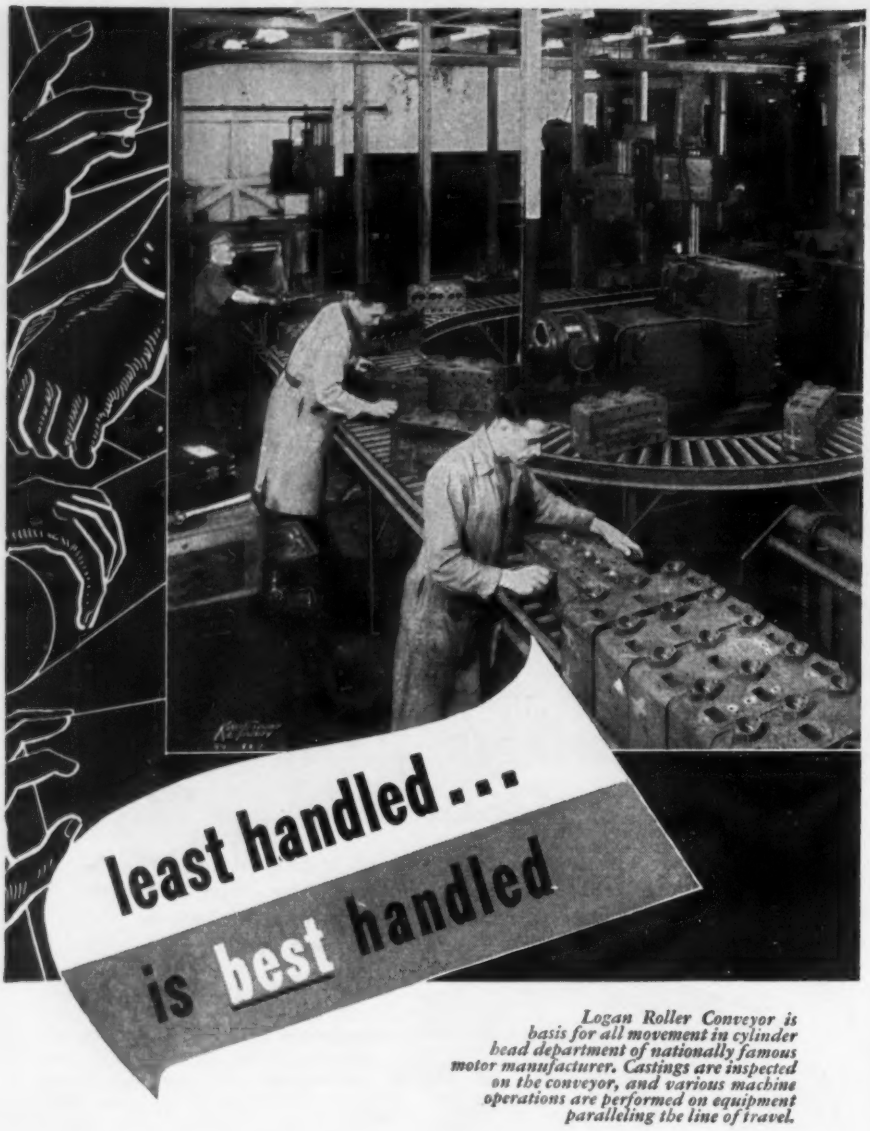

Logan Roller Conveyor is basis for all movement in cylinder head department of nationally famous motor manufacturer. Castings are inspected on the conveyor, and various machine operations are performed on equipment paralleling the line of travel.

EACH "manual" movement costs money . . . in an industrial plant. You can reduce this cost toll if you will, by mechanizing every possible handling operation with Logan Conveyors.

With Logan equipment doing the moving, workers are free to exercise manual skill and ability in purely productive tasks.

Reducing the number of "pick-ups and lay-downs" of work in process, and substituting a profitable "flow" of movement are vital functions of modern conveying.

Under modern competitive conditions, a well-engineered conveyor system often can make the difference between profit and loss.

Logan Conveyors

LOGAN CO., INC., 535 CABEL ST., LOUISVILLE 6, KY.

and discharge ends.

The mixture of preheated, crushed coal and breeze is conveyed by the revolving action of the inclined carbonizer toward the discharge end. At the point where the material is fed into the retort, the temperature of the steel cylinder is about 850 degrees Fahr., the charge material having an initial temperature of 600 degrees Fahr.

The hot, dry, but as yet free flowing charge material moves easily as it enters the retort. Under the effect of the gradually increasing temperatures as it moves with the rotary action of the carbonizer, the material begins to soften. When the charge itself reaches a temperature of about 700 degrees Fahr., it begins to give off hydrocarbon vapors. Distillation of the material begins at this point.

With distillation, there are further changes in the texture and flow of the material. The softening particles become plastic and start to adhere. Some parts of the coal soften more rapidly than others and wet the surfaces of adjacent particles, thus binding the whole into a coherent, plastic mass, in which the breeze acts as an aggregate.

Instead of a freely rolling material, it is a viscous mass. Flow of this mass through the carbonizer is retarded at this point because the movement of the thickened bed of material over the arc of the revolving shell is slowed down materially. The revolving action of the cylinder kneads and compresses the plastic mass and as it falls about, it is disintegrated into smaller masses. Transition through the plastic stage is rapid, from five to ten minutes. The rising and falling motion within the retort causes the material to form into individual pieces. Moving along and out of the way of on-coming coal, as they are forced to do, the compacting and adhering masses become dry and solid, finally taking a roughly spherical shape.

The final product is in the form of coke balls, ranging from 1 to 8 inches diameter. Metal temperatures at the discharge end of the carbonizer reach a maximum of 1040 degrees Fahr., but the material itself does not reach beyond 850 degrees. As a means of preventing too fast or too slow movement of the material from the feed to the discharge end of the carbonizer, dams and lifters have been built into the sides of the cylinder, thus controlling the total movement until the desired distillation of the volatile elements has been accomplished and likewise assuring the proper forma-

● Wyckoff Cold Finished Steel takes the guesswork out of machining by supplying *uniform structure* bar stock that performs the same on your machines . . . every lot . . . every day. With constant machining characteristics in your steel, all other variables are under the control of your machinists.

Such uniform characteristics are maintained in cold finished steel by Wyckoff's exclusive Structure Controlled Annealing—and once the best machining structure is established for your needs, *Wyckoff* can faithfully reproduce it on every lot . . . month after month.

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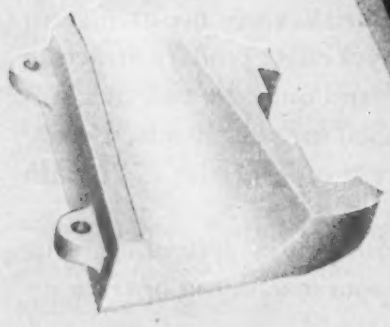

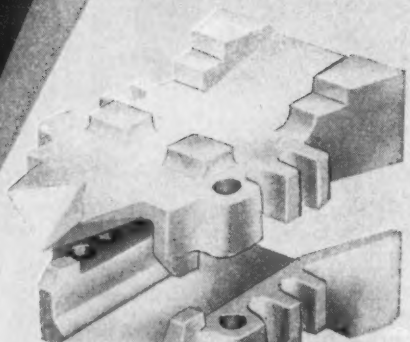

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YOUNGSTOWN ALLOY CASTING CORPORATION

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tion of the product into ball shape.

Discharge and Cooling: Each carbonizer is fitted at the discharge end with a short cylindrical screen which screens out the minus ⅜-inch breeze. This breeze is collected by a conveyor and sent to a storage bin. Additional degradation breeze from the handling system and from the screen at the loading point is also gathered and carried by conveyor to a roll crusher where it is crushed to minus 4 mesh and sent to this same bin. As pointed out, this breeze, sometimes supplemented by specially crushed product, is drawn from the bin as needed and mixed with the coal charge. Thus, normally, all undersize product is recirculated through the carbonizer as an important part of the process for controlling size and quality of the final product.

The solid product of all carbonizers is collected on a gathering conveyor, passed over a rotary grizzly and the oversize reduced in a roll crusher. Shaking conveyors carry the product to the cooling system.

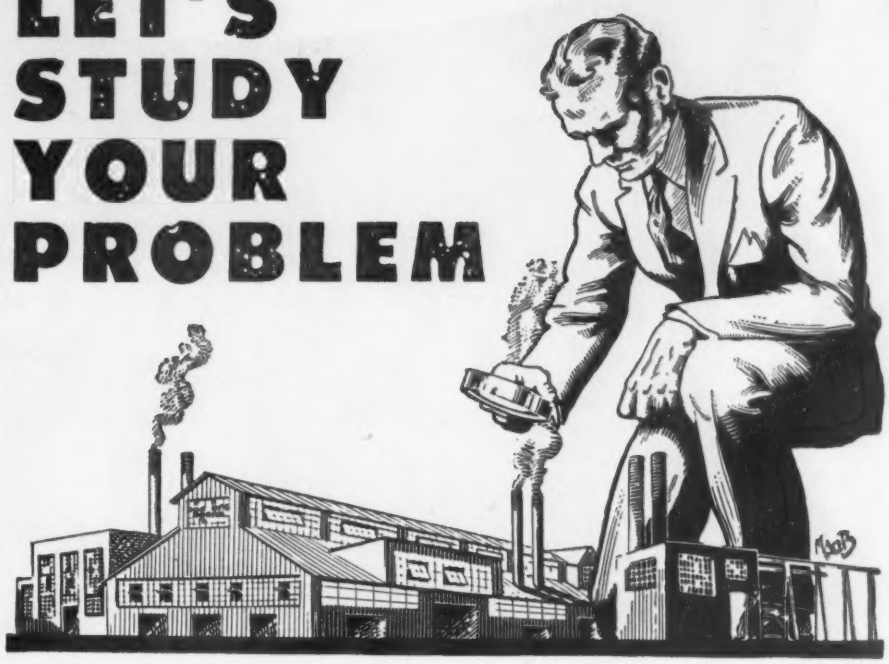
A careful method of cooling is required. Effect of water quenching on the larger pieces is particularly detrimental, as shrinkage cracks develop and lead to degradation. Since the product is highly reactive, it is also necessary to keep the fuel in movement until it has been partially cooled.

The center temperature of the particles upon discharge from the carbonizers is close to 850 degrees Fahr., and if the lumps at that temperature are allowed to remain stationary and in contact with each other for any length of time, they will catch fire. Small and frequent movement of the individual pieces, while cooling in air, prevents firing, and the system of cooling in use depends on this fact.

After the larger balls are crushed to size, the minus 2-inch material is screened out and thoroughly quenched with water. The larger sizes are cooled for two hours on a mechanical cooling wharf, which is a series of slotted cast-iron hinged grates in steplike formation, the whole inclined at an angle of 18 degrees. An endless chain equipped with a variable number of trippers passes underneath and raises and lowers each grate in turn in a wavelike manner, which conveys the product down to the discharge end of the cooling wharf and moves the bed of fuel to prevent firing.

After the cooling period, the large pieces combine with the minus 2-inch wet-quenched product on a conveyor

LET'S STUDY YOUR PROBLEM



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It wraps up in one solid steel-encased package, user preferences formerly obtainable only as custom-built features, if at all.

It makes available to industry, in a standard line of motors, improvements perfected for special wartime requirements.

Life-Line Motors are now in production at the new Buffalo Westinghouse Motor Plant, in frame sizes representing the popular demand of induction motor ratings. Check your nearest Westinghouse office for availability, or write Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

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All frames, feet and brackets are HEAVY STEEL. Stators are far stronger... new core locking device eliminates rivets.

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Life-Lines cut vibration and noise to new low limits for standard motors... satisfy many "special motor" needs.

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Life-Line Motors occupy less space per hp than any other standard motor... are easier to build into machines and install in cramped quarters.

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New insulating materials... coil winding techniques ... stator slot designs... give new record-setting protection against electrical failures.

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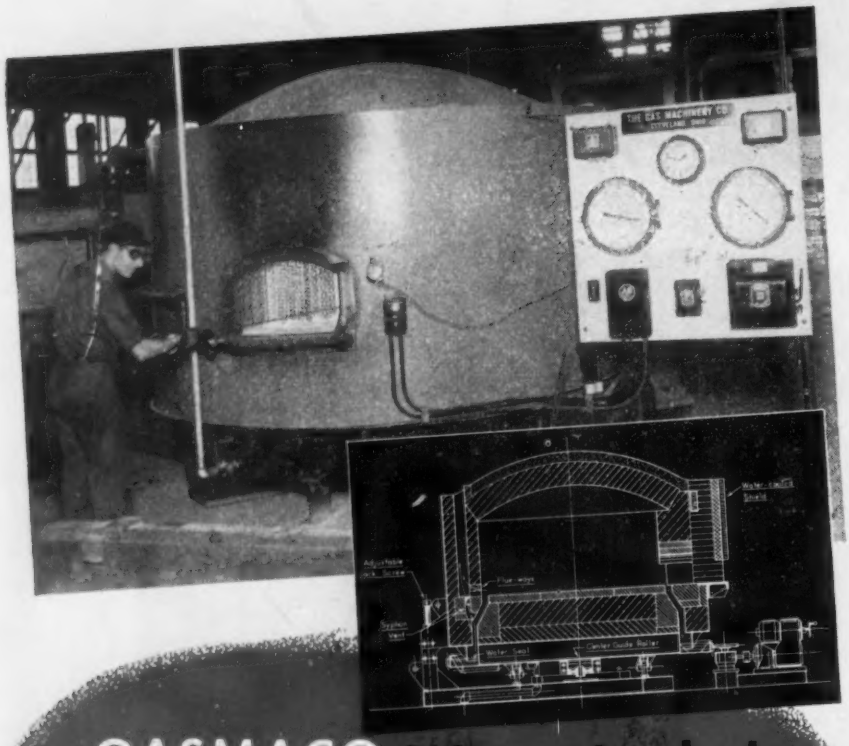
The Life-Line has sleek lines ...a smooth finish... discourages dust and dirt accumulations... harmonizes with modern machine and tool design.



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FOR FORGING, ANNEALING
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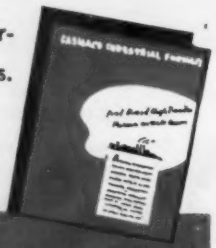
This is one of a complete line of Rotary Hearth Furnaces built in various types and engineered for specific applications of forging, annealing, heat treating, tempering and clean heat treating.

Each furnace is carefully designed to require the least possible operating labor and to reduce maintenance costs.

The floating hearth plates (patent applied for) prevent warpage and maintain a uniform load on each roller. Another and very important feature is the water sealed hearth using patented syphon vents (illustrated in drawing above) to short circuit any water vapor, formed above seal, directly to the flue ways.

It will pay you to investigate these outstanding furnaces. Let's talk over your heat treating problems.



WRITE FOR FOLDER A-100

THE GAS MACHINERY COMPANY
16116 Waterloo Road • Cleveland 10, Ohio

and are carried to a screening plant where they are separated into sized "stove" and "furnace" signs.

Distillation products leave the carbonizers at the upper, or feed end and pass through a chamber where dust is collected over a water seal. The wet dust is removed with a drag conveyor and used as boiler fuel.

Coal gas then passes to a primary wash box, where, by water sprays, about 60 per cent of the tar is condensed. A scrubbing tower follows for further cooling and removal of tar. The gas temperature after leaving this cooling tower is 85 to 90 degrees Fahr. Each unit has its own dust collector, condenser and scrubber. Gas is exhausted by a centrifugal exhauster and passed to the burners through a holder which regulates the gas pressure. This gas, which contains the unrecovered light oil vapors, is used in heating the carbonizers and preheaters, and is sufficient for that purpose except for some purchased gas used for pilot lights.

Tar is drained from the wash boxes, scrubbers and liquor tanks to settling tanks where liquor is decanted and recirculated. After settling, the tar is pumped to storage tanks for delivery to the tar plant. The liquor is cooled in a natural-draft cooling tower. No attempt is made to recover by-products from the liquor. The yield per ton of charged coal is as follows:

Smokeless fuel, lb.	1440
Gas (btu 375), cu. ft.	3700
Crude tar, gal.	15

The yield from each 100 gallons of crude tar is as follows:

Tar acid oil, gals.	28
Creosote oil, gals.	25
Fuel pitch, gals.	19
Pitch coke pellets, lb.	204

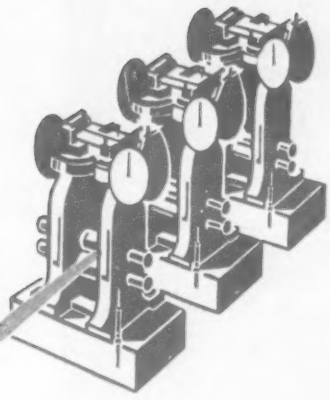
The plant will operate continuously except for a few short-term shutdowns a year to permit maintenance and to clean out the scale in the carbonizers.

Conveyors To Be Exhibited At Metal Show

An operating installation of the Press-Veyor power belt conveyor moving stampings from a punch press will be exhibited by Rapids-Standard Co. Inc., Grand Rapids, Mich., at the National Metal Exposition and Congress in Chicago, October 18 to 24. Also to be shown are a lightweight aluminum Rapid-Wheel gravity conveyor, steel forged and flame hardened casters and a new power belt conveyor designed for use as a pusher in a gravity conveyor line and as a stacker.

When you need high quality cold-rolled steel for a special job . . .

✓ *check with* SANDVIK

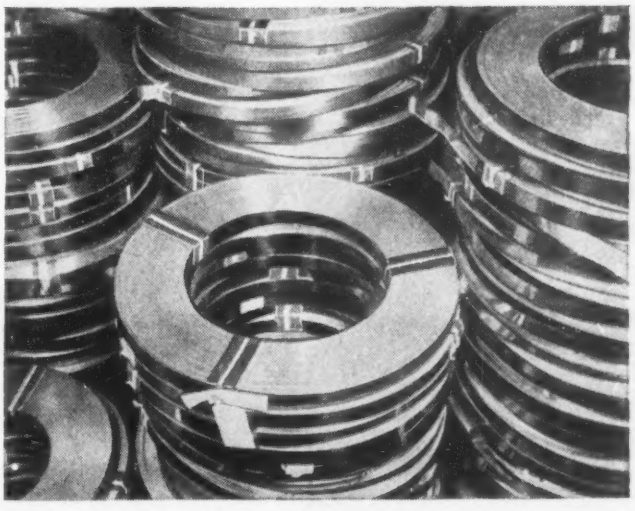


For twenty-six years Sandvik has been supplying quality cold-rolled steel to meet the high physical demands of a wide variety of special purposes.

The specialized abilities of Sandvik steel are a result of the materials and methods used in its production. High quality ore of extremely low phosphorous and sulfur content is smelted in small furnaces, using the purest metallurgical fuel – obtained from coniferous forests.

The high grade pig iron thus produced is combined with equally pure scrap, and the steel is made by the acid open hearth process in small electric furnaces designed for accurate melting control.

After the steel is born, Sandvik's skill and experience carefully perform the many subsequent operations needed to make it ready for use.



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SS-16

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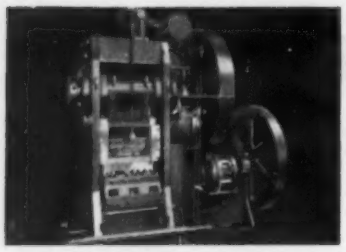
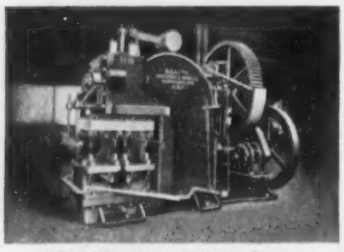
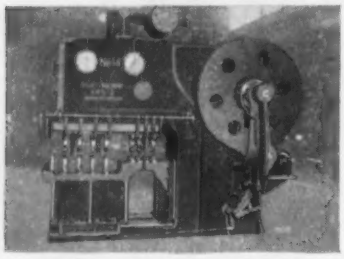


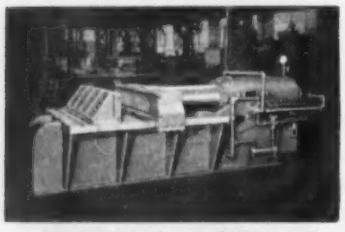
BEATTY Guillotine Bar Shear in capacities up to 300 ton.



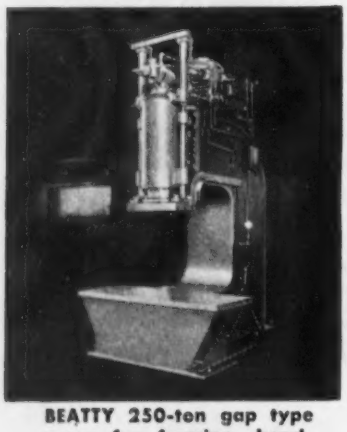
BEATTY No. 11-B heavy duty punch for production tooling and use with BEATTY Spacing Table.



BEATTY No. 14 Toggle Beam Punch for structural steel fabrication.



BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging, bending.



BEATTY 250-ton gap type press for forming, bending, flanging, pressing.

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HYDRAULIC HEAVY METAL WORKING EQUIPMENT

BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA

Rubber Forming Dies

(*Continued from Page* 126)

ducing the parts. As shown in Fig. 1, a stainless steel sheet 0.053-inch thick was slit 3 inches wide and then sheared 4 inches long to produce blank A. The corners of this piece were hand sheared, and a 1¼-inch diameter hole was pierced in the center, to allow for material to flow while forming. The operations performed progressively produced blanks B and C. Blank C was then placed in the form die over the forming mandrel D, which was made by turning around steel mandrel, machining two flat lands 180 degrees opposed, and then splitting the mandrel lengthwise parallel to the lands. One half was used for the form die and the other half for the final pierce die, later.

Making Rubber Forming Block

Rubber forming block E, made of three pieces of ¾-inch synthetic rubber was placed over blank C. Pressure punch F struck rubber forming block E, which was confined in machine steel frame G. The pressure of punch F compressing rubber forming block E, which in turn applied pressure to blank C, forcing it to follow the contours of mandrel D, thereby producing formed blank H. The radii on the ends were then disk ground by hand to finish the contour.

As shown in Fig. 2, blank A, is nested on die block B. This locates hole in punching over hardened bushing C. Then a stock pierce punch was used to repierce the 1¼-inch diameter hole to drawing size. When the pierce punch was withdrawn from the die bushing, synthetic rubber stripper E stripped blank F and the part was complete.

Another application of a forming die employing rubber as the punch was used effectively on a part that was previously made by spinning. Not only was the contour of the part more accurate, but the cost was considerably reduced by the use of this newer method, which produced 30 parts per hour, in the final forming operation.

Fig. 3 illustrates in detail the first four operations in producing the part. Blank A was drawn in a conventional cast iron draw die to form shell B, which was then trimmed to a developed height, to produce shell C. Shell C was then placed inside die ring E, over pad D and struck with punch F, thus forming shell G.

Tools for the final operation are shown in Fig. 4. Shell G, was placed in a split shaping or forming die

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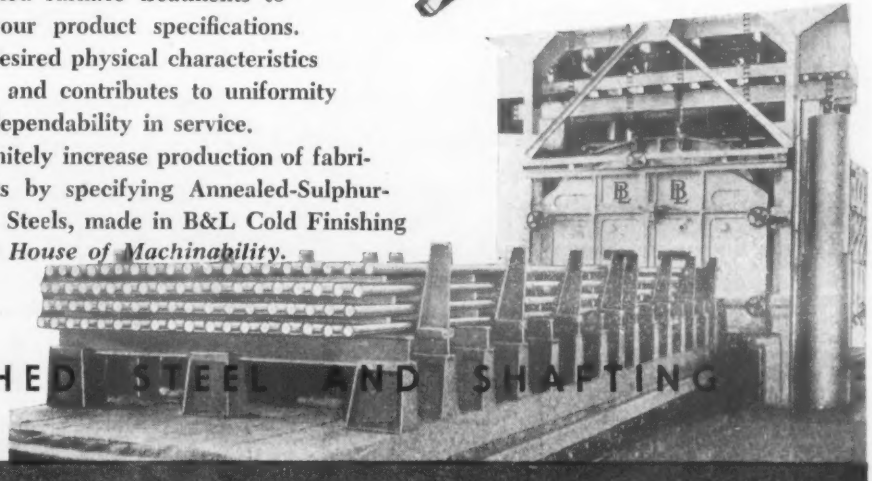

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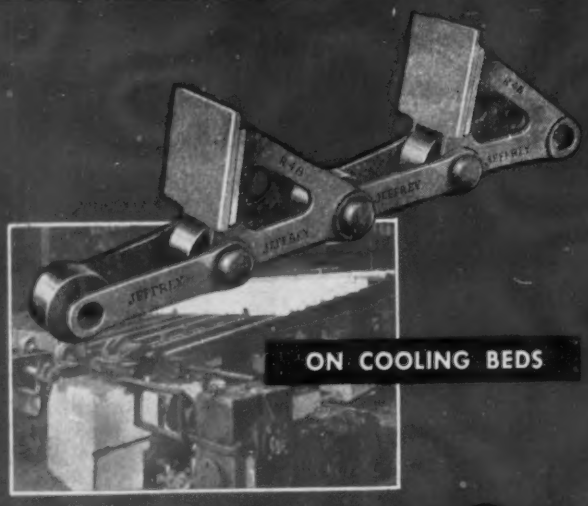
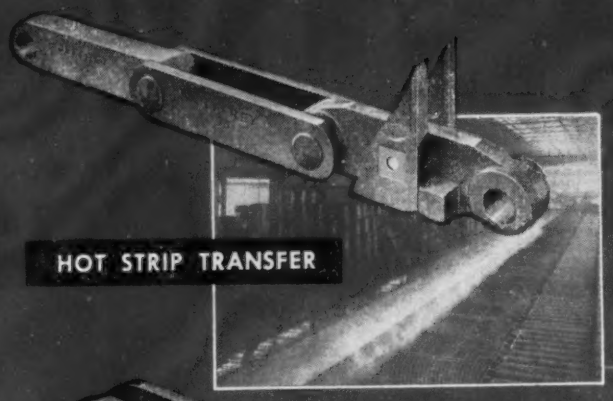
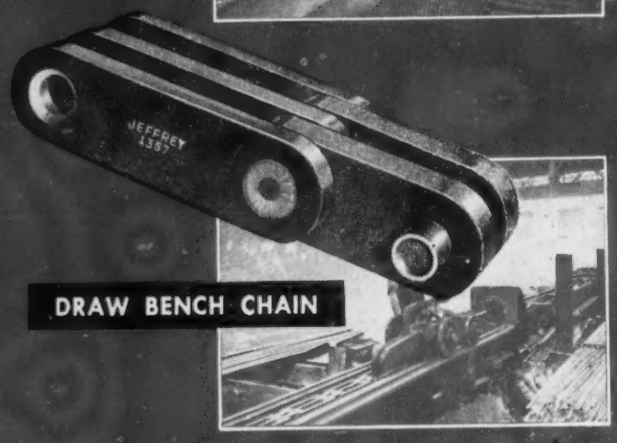


ON COOLING BEDS



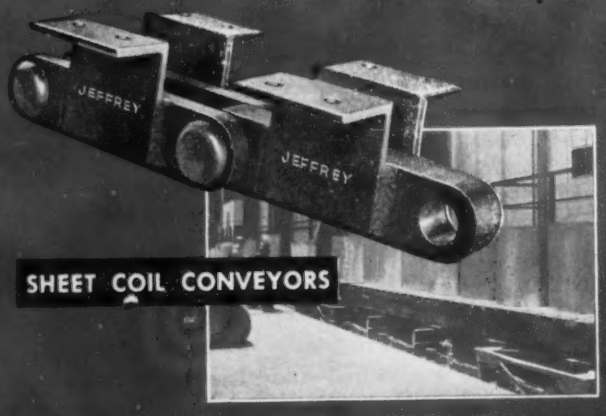
HOT STRIP TRANSFER

CROP CONVEYORS



DRAW BENCH CHAIN

HOT COIL CONVEYORS



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made of special cast iron. The split sections of the die are closed around shell G and are held tightly together by studs E. Punch B applies pressure to A, the bulging medium, which is composed of three pieces of ½-inch thick rubber cemented together for ease of handling and the shell is formed into its final shape as shown by D.

As mentioned previously, these parts were once formed by the spinning method. Using rubber forming method thousands of parts were produced to a tolerance of plus or minus 0.002-inch on the small diameter. Most expendable part of the die was the rubber bulging plug; its average life was approximately 100 parts.

New Sheet Metal Forming Method Developed

Finding it impossible to draw a "wing trailing edge fillet" by conventional methods without wrinkles which, when removed, left marks and blemishes, Solar Aircraft Co., San Diego, Calif., developed the Sol-A-Die process which depends upon a simplified routine method for making stage or restrike dies. The part was formed from 24 S-O Alclad sheet 0.025-inch thick, later heat treated to 24 S-T.

In the Sol-A-Die process, as reported in the August, 1947 *Metals Review,* the part is stamped to full size in a very shallow first stage which develops the required differential areas. The final die folds the preformed blank. It is reported that the necessary draw is decentralized and the shallow slopes and use of rubber in the first stage allow careful control of metal movement, practically eliminating wrinkles. Stress concentrations are kept low, the only deformation is the final fold, the company states.

Electrical Equipment Safety Charts Available

Six colored illustrations and a page of instructions make up the "do's and "dont's" industrial safety chart series V released by Division Labor Standards, U. S. Department of Labor, Washington 25, D. C. This set of charts, designed for maintenance men and those who install electrical switchboxes, fuses and protective equipment in plants, completes a series of 22 sets of charts issued by the bureau to promote safe working practices around common types of industrial equipment.

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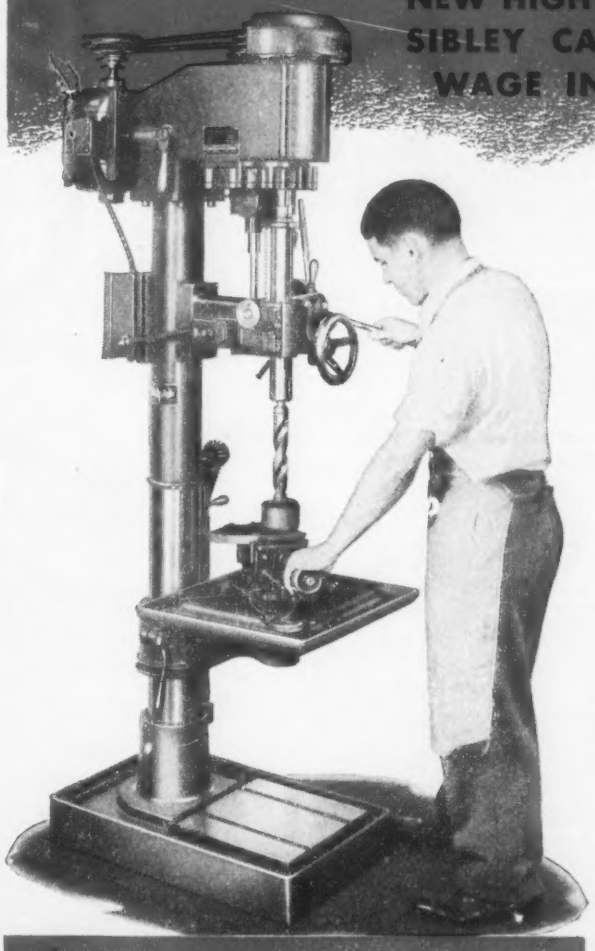

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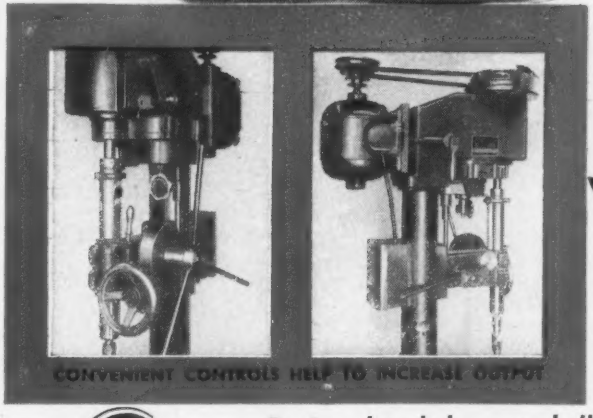

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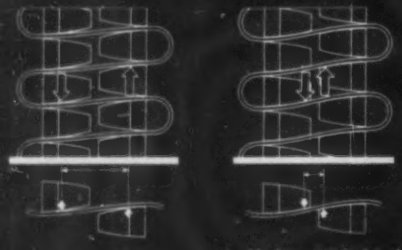
HOW FALK STEELFLEX COUPLINGS WORK

1. Grooves, in a precise arc, and with a radius and length proportional to the capacity of the coupling, are cut into two identical hubs of moderately high carbon steel—forged of Falk alloy cast steel.

2. These grooves provide a slot for a grid member made of chrome alloy steel with an elastic limit of 180,000 pounds per square inch and an ultimate strength of 220,000 pounds per square inch.

3. This grid fits snugly into the curved grooves cut into the hubs of the coupling. The grooves provide a scientifically cut bearing surface for the grid. This bearing surface extends from the outer to the inner edge of the grooves. The grid bears on the grooves in proportion to the load.

4. Under light loads, the grid bears only at the outer edges of the grooves. This permits a long, free, elastic span between the outer edges of both hubs. Power is transmitted through almost the entire length of the grid rung.

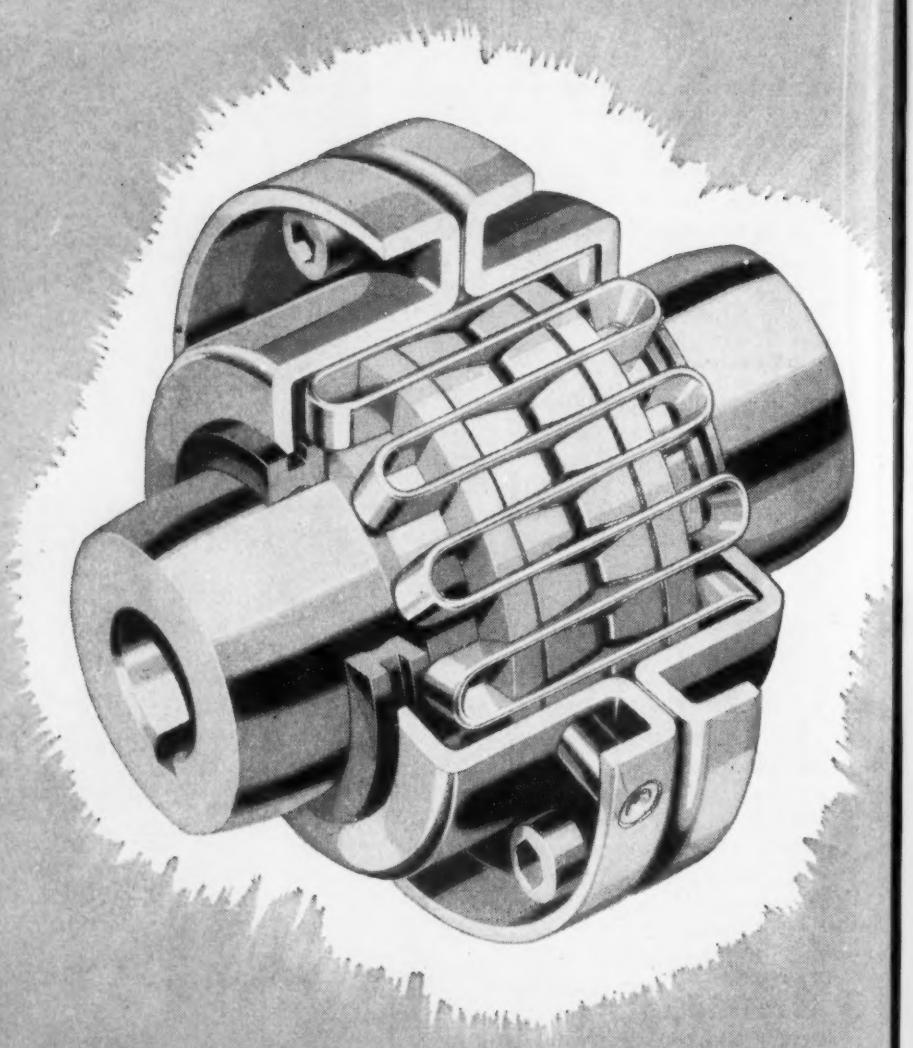


5. Under normal loads, the grid bears on a larger area of the grid grooves and the span of the grid run is shortened. It transmits more power and maintains its capacity to absorb shocks and dampen vibration.

6. Under peak loads, the grid rungs bear over almost all of the curved surfaces of the grooves. The span of the grid rung becomes very short. Under the impact of shock loads the grid flexes and continues to transmit power smoothly.

Falk gives you, in the Steelflex Coupling, a plus-value coupling. Through the grid-groove design, the Falk Coupling transmits power with minimum loss because of angular and parallel misalignment, and with free end float where desired. At the same time it provides torsional resilience that absorbs shocks, dampens vibration, and cushions even severe peak loads.

Why it costs to buy and



FALK Steelflex Couplings offer proved economy

No other coupling has *all three* advantages which combine to lower your total coupling costs

1. **Torsional Resilience:** This ability to spread the peak of shock loads over a longer time reduces stresses in your connected machinery. It is provided by the Falk Steelflex grid-groove design.

2. **Flexibility:** The all-steel construction of the Falk Steelflex Coupling assures greater flexibility in actual service . . . and prolongs the working life of connected machinery.

3. **One Type for Most Uses:** Improvements in design make it possible to meet practically all industrial installation requirements. This fact facilitates buying, replacing, or servicing couplings promptly.

you far less

maintain FALK couplings

Key men in industrial plants everywhere are swinging, in increasing numbers, to Falk Steelflex Couplings—many of them because experience has taught them that it costs less to replace a grid than to replace an entire coupling! This means important savings.

You *can't buy more economical couplings* than Falk Steelflex! For when an ordinary coupling fails, you must buy a complete new one—but should overstrain, overload or misuse damage the removable grid of a Falk Steelflex Coupling, you replace *only* the grid, and pay for only a grid—*not* an entire new coupling.

It is as simple as that.

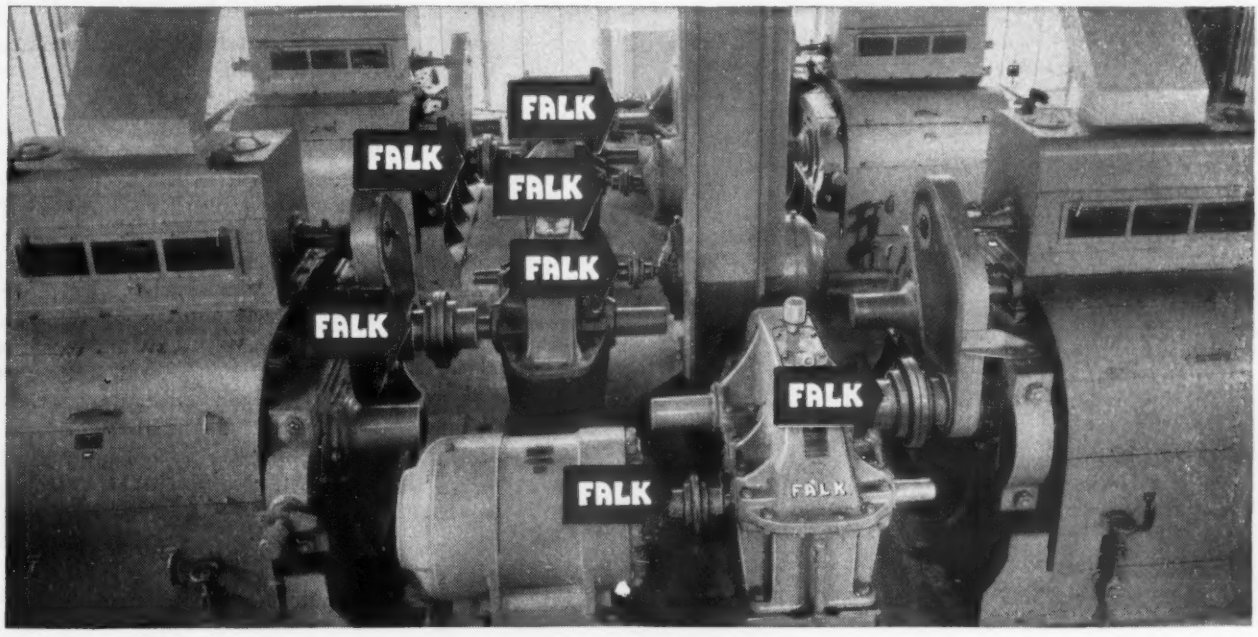
Falk Steelflex Couplings are precision built; they provide both torsional resilience and flexibility; its newest improvements permit it to fill practically all industrial applications. And . . . maintenance costs are lower.

When you need a new coupling, you need it badly—and *immediately!* Falk Steelflex Couplings are readily available in all parts of the country. Ample stocks are maintained by reliable selected distributors at strategic locations. They will help you select the proper Falk Steelflex Coupling by the Falk "three-dimensional" method—the scientific selective method based upon:

1. **THE SPECIFIC APPLICATION.**
2. **HORSEPOWER OF THE DRIVING UNIT.**
3. **OPERATING SPEED (RPM).**

If you want to inaugurate true coupling economy in your plant, start using Falk Steelflex Couplings now.

Throughout Industry . . . from Power *all the way* to Production it's . . .



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RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

Solid Steel Blocks

(*Continued from Page* 129)

and nuts of hot or cold rolled steel. Nonsteel parts are honed brass tubing, bronze piston rod bushing, and synthetic seals and dirt wiper.

Same materials are used in low pressure hydraulic cylinder, with the substitution of the hydraulic system of seals. In the 2000 pounds per square inch high pressure hydraulic cylinder, honed seamless steel tubing and iron alloy piston are used, and all other parts are increased in size to maintain liberal factor of safety. Moving parts are machined from steel whenever possible for maximum strength with minimum weight.

Special Machines Developed

Special machines were developed to facilitate production runs of the various precision parts for cylinders. These machines insure exact duplicates of each part made to close tolerances, so that all parts are completely interchangeable in similar cylinders of the same size. A special hydraulic multiple drill locates with identical precision and drills five holes in the cylinder head for the piston rod and the four tie rods in a single operation. Hydraulically operated drill jigs securely hold the port during machining and quickly release it after the operation is completed. Special honing machines with automatic take-up hone the inside diameter of brass and steel cylinder barrels to 10 micro-inch finish. A special air-oil cylinder operated end mill with twin cutters, machines two flats simultaneously on standard piston rods, and can machine four or six flats when specified by the customer. Air-oil cylinder operated feeds on lathes control quality work and speed production. Metal cutting band saws equipped with Sawmatic attachments for automatic operation cut heads, caps, pistons and followers accurately from steel bar stock or cast meehanite stock. Special test stands are used to run in cylinders after assembly and test them for leakproof operation. No air or hydraulic cylinder is shipped unless it will operate at line pressures of ten pounds or less.

High efficiencies of the air and hydraulic cylinders were determined in tests of more than 10 million strokes in varying temperatures. The tests were made by engineers of two other companies in their own plants, and were divided into five phases. Actual developed efficiencies during operation were shown to be 98 per cent plus. There was no apparent

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OCTOBER, 1947

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

Reducing Cost of Operations

Use "Made-to-Order" Properties of Copper-Base Alloys for Greater Efficiency

Fabricators of metal goods are confronted with the problem of maintaining reasonable costs of manufacturing in spite of rising costs of labor, supplies and materials. This problem can be attacked from different angles.

Material costs can be cut by using thinner gauges, other metals or by changing to entirely new materials. However, any one of these may have an adverse effect on quality and sales. Fabricators who have considered substitute materials have been surprised at the increased labor costs which in many cases are greater than the savings obtained.

Others are attacking the problem from the standpoint of direct labor cost which represents a substantial percentage of the total cost. Since wages have been on the upward trend for a number of years the problem resolves itself into obtaining still more production of saleable products per man-hour. This can often be accomplished by reducing the number of operations or finishes, speeding up machining, eliminating unnecessary scrap, etc.

Fabricators who use copper-base alloys recognize the sales appeal which is inherent in copper, brass and bronze. These are associated with permanence and high quality since they combine fine appearance, great strength and toughness plus superior resistance to corrosion and wear.

Are You Getting the Most Out of the Metal?

Yet there is still another quality which fabricators have long recognized, namely, *ease of fabrication*. This property is so obvious that its possibilities as a potential cost-saver are often overlooked.

Copper alloys, as everyone knows, are made to order to fit the individual needs. Is the fabricator taking full advantage of this? Let him try to answer the following questions: Is he using metal which is exactly correct for the job? Can he cut down the number of operations? Can he reduce the cost of polishing? Can he speed up his machining operations? Will a switch to a different alloy cut costs? Can he cut spoilage?

Using Fewer Operations

We have already called attention to the fact that brass today is more ductile than that made years ago with the result that it can stand greater reductions between anneals. It is up to the process engineer, therefore, to check his drawing or heading operations carefully to determine whether he is obtaining the most out of his material. In some cases the metal he is using can stand deeper draws. Often a change in composition to a more ductile alloy may bring substantial savings in the form of fewer drawing and annealing operations.

This also applies to parts made by the cold upsetting process. The use of a more ductile brass or Duronze* wire, for example, may substantially reduce split heads where the heading operation is very severe or even eliminate intermediate annealing or relief annealing operations.

See the Bridgeport Brass Exhibit at the National Metal Show, Booth No. 1251, International Amphitheatre, Chicago, October 18 to 24, 1947.

NEW FORMAT

The Copper Alloy Bulletin which has been published every month for over 10 years as an insert will appear as a 2-page spread starting with the November issue.

Reprints will be available as in the past. If you would like to have your name added to the mailing list, please write to Bridgeport Brass Company, Bridgeport 2, Conn.

We are always grateful for any suggestion or ideas which will make the Copper Alloy Bulletin more helpful to our readers.

Speeding Up Machining

It is common knowledge that lead, when added to the composition of brass, greatly improves its machinability. Lead, however, reduces the ductility of the metal. Where both good drawing properties and machinability, such as drilling and tapping, are required, sufficient lead is added to improve its machinability without greatly affecting ductility. For example, our alloy No. 40 brass contains .20% lead. Strip of this composition is suitable for deep drawing operations requiring light machining, drilling and tapping. However, more lead can be added if the drawing requirements are not so great and increased machinability is called for.

Cutting Down Spoilage

Although brass rod for screw machine operations such as Ledrite** 6 Standard contains about 3% lead and is exceptionally free machining it is suitable only for about 90% of requirements. In some instances both free machining, plus cold working operations such as roll threading, knurling, forming or expanding are needed which require a medium leaded brass rod such as Ledrite 2 which contains about 1.8% lead. Less lead can be furnished if the nature of the operations require it.

Substantial savings can also be accomplished by reducing the percentage of faulty work or extra operations, many of which can be traced to the wrong temper of the metal. For example, if the brass wire is not soft enough, it is apt to check on the surface or shear during heading. Wire with a softer temper or the use of a more ductile alloy may be the answer to scrap reduction.

A Rough Surface Is Costly

Polishing costs can often be substantially reduced by preventing the formation of a rough surface on the finished article. This is done by keeping the grain size of the metal down as small as possible without sacrificing too much ductility. It often happens that the metal which comes from

*Reg. U. S. Pat. Off. **Trade-mark

(*Continued on page 2, column 2*)

COPPER ALLOY BULLETIN

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

GALVANIC CORROSION

Effect of Aeration or Oxygen on General Corrosion

(Continued)

Experience has shown that oxygen found in air, water or in oxidizing agents is one of the most powerful offenders in accelerating corrosion. The removal of oxygen or the addition of a protective film to exclude oxygen slows down corrosion to a small fraction of its original intensity.

Over a hundred years ago (1824) Sir Humphrey Davy observed that copper in sea water, from which air was excluded, was not corroded. Similar results (no attack) have been obtained in our laboratory with copper in air-free sulfuric acid and ammonium hydroxide solutions at room temperature.

F. Frese in his studies on the "Effect of Oxygen on the Corrosion of Steels" in 3½% sodium chloride solutions clearly showed that the increased concentration of oxygen brought about by increased pressure very markedly influenced the rate of corrosion of steel as shown in the following table:

Oxygen Pressure	*Rate of Corrosion*
0.2 atmospheres†	12 mdd.‡
1.0 "	51 "
10.0 "	472 "
61.0 "	1650 "

†1 atmosphere=14.7 lbs. per sq. in.
‡mdd. = milligrams per square decimeter per day.

Effect of Oxygen and Oxidizing Agents on Galvanic Corrosion

The galvanic couple, iron-copper in aerated 3% sodium chloride solution, represents a strong couple. This type of couple produces a fairly substantial flow of current. O. P. Watts (1935) found that the exclusion of air stopped galvanic corrosion in every instance which he investigated. For example, an iron-copper couple in 3% sodium chloride, containing sufficient carbon dioxide to lower the pH to 3.9, stopped corroding in the absence of air.

In the popular dry cell, zinc-carbon couple, *a high concentration of oxidizing material* is added in order to produce a commercial cell which will deliver a useable current. The resulting rapid galvanic corrosion produces a substantial flow of electricity.

In a previous discussion (Copper Alloy Bulletin, January, 1947) we showed that the primary effect of galvanic coupling is to

(Continued in Column 3)

localize the corrosion on the less noble metal (anode) and lessen corrosion and protect the more noble metal (cathode). In aerated solutions the area of the cathodic surface directly affects the corrosive reaction.

Effect of Velocity

The rate of corrosion is influenced by the pressure or concentration of oxygen and by the ratio of area of the cathodic surface to the anodic surface. Therefore, the rate at which the solution flows over the cathodic surface to supply oxygen to it will also affect the rate of corrosion. The rate of flow merely controls the quantity of oxygen which is brought into contact with the cathodic surface. For example, an increase in the rate of flow over the cathodic surface would be expected to increase the corrosion rate of the less noble metal.

Reducing Cost of Operations

(Continued from page 1)

the mill has been specially produced with a small grain size. However when the fabricator anneals this material between operations he may use too high a temperature which results in a larger grain size which may be responsible for the roughened surface when the material is stretched during forming or drawing. Rough handling may also introduce scratches and nicks. Smooth metal requires a minimum of polishing and coloring, whereas metal with a roughened surface must be cut down by removing material, an operation which involves both time and expensive supplies.

Eliminating Plating

When considering substitutes, manufacturers should not forget that the copper-base alloys are among the easiest to prepare for beautiful finishes. Furthermore the beauty with which they are endowed is more lasting than can be obtained on other types of metals.

Fabricators often take advantage of the natural beauty of the metal to enhance their products. For example, a manufacturer eliminated a gold plating operation by polishing and lacquering rich low brass which has color similar to 14 K gold.

A Substantial Saving

Shifting from one copper-base alloy to another may bring substantial savings. A manufacturer of silicon bronze nuts switched to Duronze III (silicon aluminum bronze) and obtained 10% more without adding to his material cost. Duronze III is 10% lighter than other types of silicon bronzes but costs the same on a pound basis.

Bridgeport's policy of advising customers who fabricate metal goods has been established for many generations. Fabricators, therefore, should not hesitate to call on our Laboratory for any help we can give on their metal problems to cut costs or to improve quality. They should benefit from the progress that has been made in copper-base alloys.

Discuss Your Problems At the Chicago Metal Show

On October 18–24 we will exhibit at the National Metal Show to be held at the International Amphitheatre in Chicago. We will welcome visitors to our Booth No. 1251, where we will display our products. We are particularly anxious to meet engineers, designers and plant foremen connected with the metal fabricating industry who wish to discuss their problems with our metallurgists and technical service men who will be in attendance.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A Drawing and Measuring Instrument now available provides 8 tools in one—a combination square, protractor, right triangle, ruler, compass, French curve, mitre and scribing tool. The instrument is compact and versatile and can be used to advantage by engineers, draftsmen and shop mechanics. **No. 797**

Thread Rolling Attachment said to be useable on practically any automatic screw machine or turret lathe, rolls straight threads at same speeds employed for other machining operations. Attachments are individually designed for use on screw machines to produce particular diameter, pitch, form and length of thread. **No. 798**

Boring Bars of cemented carbide are announced which make possible the precision boring of holes having length to diameter ratio of 8 to 1. Rigidity is claimed to be 2.8 times greater than that of steel, thus raising the practical limit of precision boring of holes. Two types are available: a solid carbide bar with carbide boring tool brazed into recess; and a solid carbide bar with steel insert in which boring tool is held with set screws. **No. 799**

New Contour Cutter-Sharpening Machine takes form cutters to 12" diameter with maximum 12" length between workhead and tail center to grind 6" maximum length of contour with one template setting. It duplicates a metal template outline to sharpen convex or concave radii, angular faces and combinations. A vertical positioning slide provides for clearance and back-off angle grinding. **No. 800**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

Warehouse Service with Slitting Facilities in Principal Cities

STRIP AND SHEET—For drawing, stamping, forming, spinning. Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Alloys suitable for springs. Engravers' copper and brass.

WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors, Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—for conditions too severe for a single metal or alloy.

PIPE—Brass and copper for plumbing.

FABRICATED GOODS—Plumbing brass goods. Radiator air valves. Aer-a-sol insecticide dispensers. Automobile tire valves.

TECHNICAL SERVICE—Staff of experienced, laboratory-trained men available to help customers with their metal problems.

WAREHOUSE SERVICE—Warehouse and jobbers stocks available for prompt delivery in principal cities.

TECHNICAL LITERATURE—Manuals and handbooks available for most products.

"Bridgeport" BRASS

BRIDGEPORT BRASS

BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865

Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal

loss of oil or air. Temperature rise of six degrees only was noted between 2 and 8 hours of operation. Maximum speed at full cycling operation was determined to be 450 cyclings per minute which produced a 1/2-inch stroke. At 120 strokes per minute a 2-inch stroke was obtained. Rate of pressure drop indicated a variation of only 2 1/2 per cent between static and kinetic coefficient of friction. A check test in a third plant later confirmed these high efficiencies.

At the completion of the 10 million stroke tests all seals were still holding pressure without leakage. When cylinder was disassembled after tests seals were found to have 80 per cent of useful wear life still remaining. All metal wearing parts were checked and found to be within the original machined tolerances.

500 KV Test Project Takes High Voltage Switch Unit

A 500 kilovolt experimental transmission line test project sponsored by American Gas & Electric Service Corp., near its Tidd plant at Brilliant, O., requires the highest voltage power switching unit ever built, according to General Electric Co., Schnectady, N. Y., builder of the unit. The huge equipment will consist of a power circuit breaker with pneumatic operating mechanism, isolating disconnecting switches, lightning arresters and bushing type current transformers.

All components will be interconnected and assembled on a supporting framework as an integrated switching unit, it is stated. The impulse power circuit breaker is of low-oil-content construction and will incorporate design improvements to handle more efficiently the higher voltage of the Tidd test project, GE asserts.

Varied Uses Advanced for All Aluminum Prefab

An arch roof, unit type, all aluminum, self supporting building, developed by Reynolds Metals Co., Louisville,, Ky., utilizes a design which reportedly withstood the rigors of service under the conditions of cold, snow and high winds in the Aleutian Islands during the war. According to the company, industrial uses of the building include service as a machine shop, storage shed, warehouse, special processing building, small factory, etc.

Standard size of the building is 36 x 60 feet, with standardized 6 foot

added h.p. FOR YOUR COMPETITIVE RACE

TUNE UP your production machine for the competitive race, and let Towmotor Fork Lift Trucks and Accessories provide the added horsepower that will keep you out in front. With Towmotor maintaining a scheduled flow of materials between every phase of operation, your production machine will function smoothly and swiftly . . . you'll get maximum output at minimum cost. There's a Pocket Catalog that lists the complete line of Towmotor Fork Lift Trucks and Accessories . . . send for your copy today. Towmotor Corporation, Division 16, 1226 East 152nd Street, Cleveland 10, Ohio.

SEND for Special Bulletins Describing the TOWMOTOR

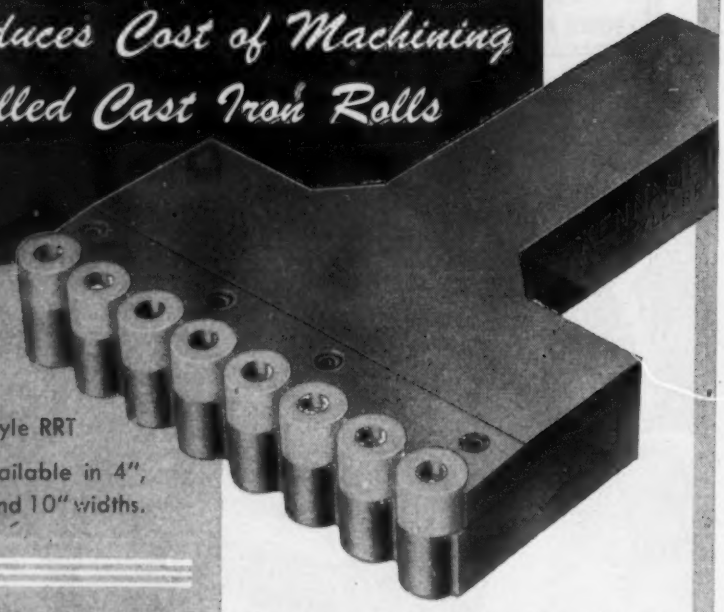
REVOLVING CARRIAGE • SIDE SHIFTER • UNLOADER • UPENDER • SCOOP CRANE ARM • RAM • EXTENSION FORKS • EXTENSION BACKREST OVERHEAD GUARD

TOWMOTOR THE ONE-MAN-GANG **FORK LIFT TRUCKS** *and* **TRACTORS**

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

New KENNAMETAL ROUGHING ROLL TURNER

Reduces Cost of Machining Chilled Cast Iron Rolls



Style RRT

Now available in 4", 6", 8", and 10" widths.

"The industry has urgently needed this development for many years to offset rising costs," say rollmen who have watched this new tool machine low and high Scleroscope rolls at faster speeds and heavier feeds . . . .

This new tool substantially reduces the time required for rough turning of chilled cast iron rolls of any Scleroscope hardness rating. Because its cutting edge consists of a series of screwed-on, long-lived Kennametal cylinders, instead of one solid blade, the following benefits are realized:

Operating advantages: Goes through rough scale easily; permits faster speeds and heavier feeds; trues up a roll quickly; reduces the work of the finishing tool.

Maintenance advantages: When cutting cylinders become dull they can be rotated to a new cutting position without taking the tool from the holder—many cuts can be made before the cylinders need to be sharpened. Sharpening of the cylinders is simple since only the tops need to be smoothed up. If one cylinder becomes damaged it can be quickly replaced with a new one, thus avoiding time loss and excessive tool regrinding.

Let us demonstrate this development under the actual conditions in your roll shop. That's the best way to be convinced that this new Kennametal cemented carbide tool does an outstanding job at the speed rates common to roll lathes and does it without babying, or special set-ups. Write for further particulars.

How It Works First cut turns a series of circular grooves with rough humps between. The tool is then repositioned and a second cut removes the humps, leaving a clean "scalloped" surface which is smoothed up with a block type of finishing tool (Kennametal Style RT)

KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

sections available which allow the length to be varied as desired. Individual arch sections can easily be raised into position after assembly on the ground, it is said. They are anchored to a concrete foundation extending 1 foot above ground level. Longitudinal members lock into the arches to form a strong rigid structural framework.

After erection of frame, sheathing sheets are attached to ends and curved barrel section. These sheets are flanged at both sides to turn up into hat-shaped channels which bolt down to the framing members, forming a weather tight, permanent seal with no exposed sheet edges. Main arches are spaced at 6 foot intervals and intermediate framing at 2 foot intervals to receive the 2-foot sheathing.

Factory Salesmen Double As Research Workers

Size of a business organization often means that a considerable gap exists between the customer and the production department. National Cylinder Gas Co., Chicago, through a different use of its salesmen, has bridged this gap, spanning it by having them talk over problems with the customer, report to the factory and then personally deliver the new equipment—created to reflect the needs of these customers.

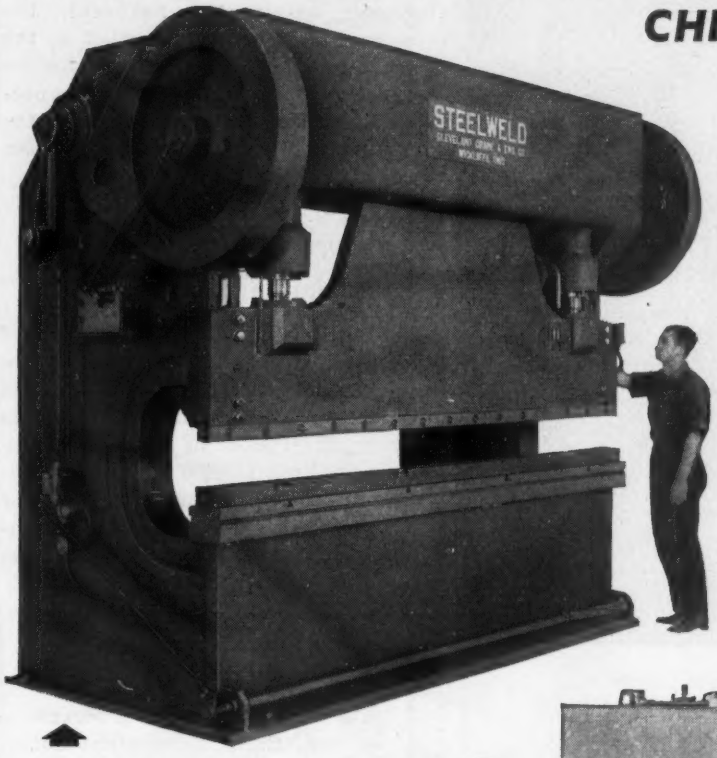
Already a familiar technique in the special tool fabricating industries, this company feels that it is pioneering in the sales-research technique for mass produced products of standardized specifications. Salesmen are encouraged to keep their ears open to difficulties which their customers are experiencing with welding and cutting equipment. Preliminary interviews establish the features which the customer would like to see in a particular piece of equipment. These are forwarded to the company's technical service department and, if the problem involves major changes, it is passed on to the engineering department.

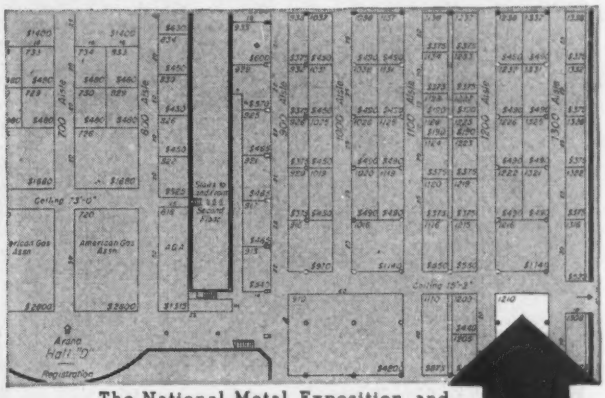
Newly designed products are thoroughly field tested under actual operating conditions make sure they are "right" before production is started. The salesman, after receiving operating instructions and being told what to expect of the new product, places the equipment in a plant where it will be subjected to a wide variety of jobs and abuses. Testing periods run from a few weeks to more than six months, depending upon the product being tested.

Every 30 days the salesman visits

SEE THESE MACHINES IN OPERATION *at the* NATIONAL METAL EXPOSITION

CHICAGO, OCTOBER 18 to 24

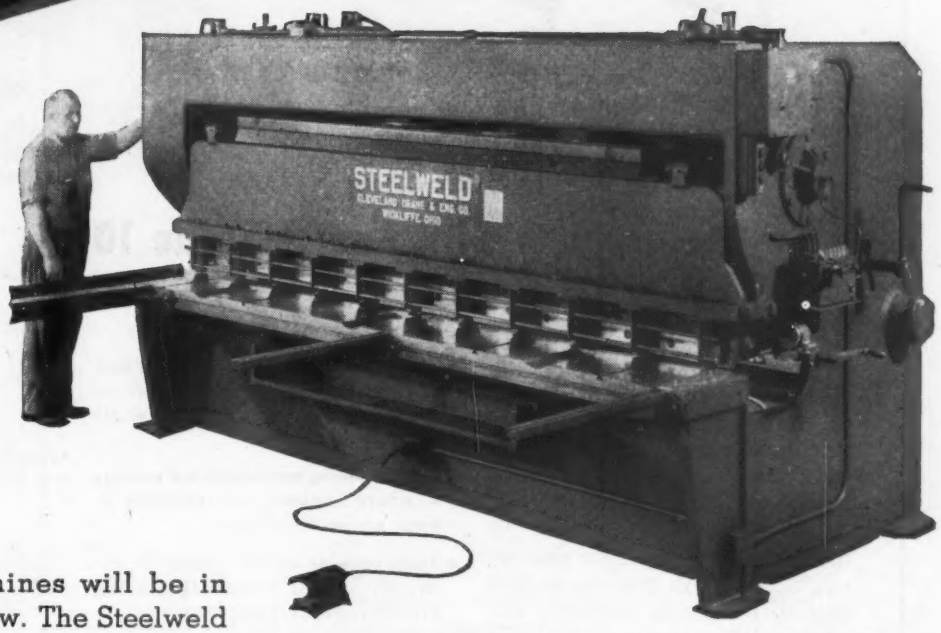




The National Metal Exposition and Congress will be held at the International Amphitheatre in Chicago.

SPACE No. 1210

STEELWELD PRESSES speed production of parts that would be difficult and costly by ordinary methods. They lower costs because press work is fast and dies are usually simple and inexpensive.



STEELWELD *Pivoted-Blade* SHEARS are radically different from all other shears. They have no slides or guides to wear out, and offer many outstanding advantages including electric foot switch operation.

These two heavy-duty machines will be in operation at the big Metal Show. The Steelweld Press has a bending capacity of 14' x 1/4". The Steelweld Shear is rated to cut 12' x 3/8" steel plate. Multi-hole punching, bending and shearing will be demonstrated.

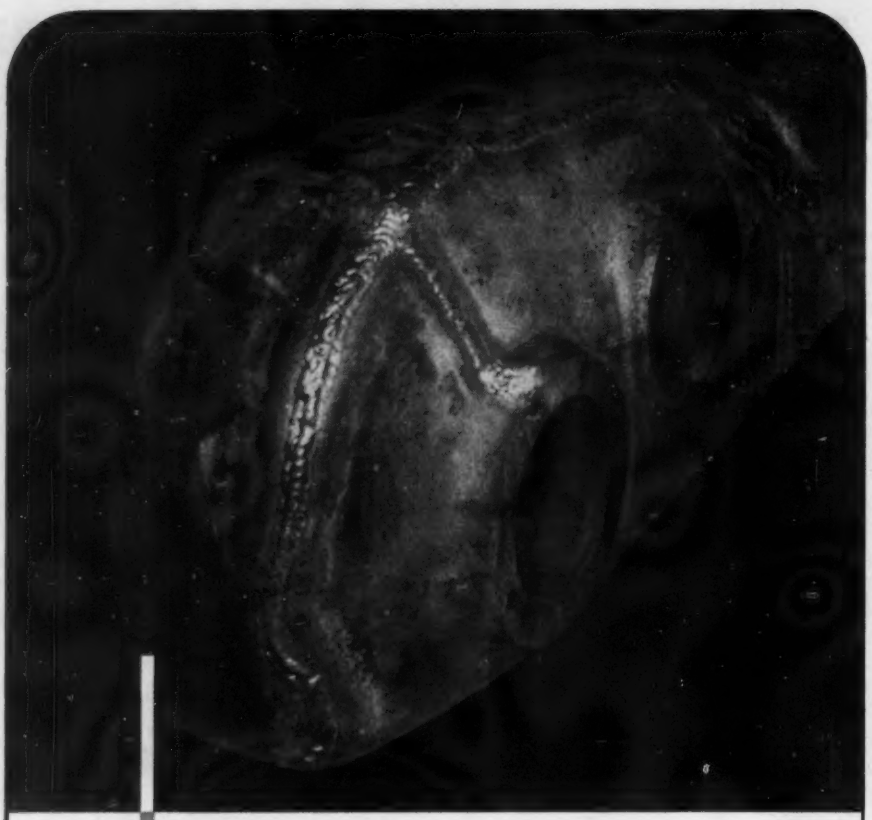
We urge you to see these modern, versatile tools.

Readily adaptable to jobbing work or long production runs, they have numerous features — many heretofore unavailable — that enable you to handle more kinds of work, quicker, better, easier.

THE CLEVELAND CRANE & ENGINEERING CO.

7813 EAST 281st STREET • WICKLIFFE, OHIO

STEELWELD PRESSES AND SHEARS



For Emergency Repairs

...weld cast iron with Ampco-Trode 10 —save time and money . . .

Typical of the way Ampco-Trode 10 saves money for its users is this tricky repair job. This cast-iron road-grader drive housing was badly damaged when a drive shaft broke. Replacements were not available. Ampco-Trode 10 took over. Only a slight preheat was necessary so that the welder had no trouble in handling the casting. All joints were V'd out and the welding done in two passes — once with an 1/8" rod and again with 3/16" rod.

One of the breaks passed through a machined flange. But the fact that Ampco-Trode 10 provided a machineable deposit as well as good strength and ductility solved this problem.

You, too, can save time and money with Ampco-Trode 10. This all-purpose aluminum bronze electrode gives you these important welding advantages:

- **Welds dissimilar metals**—steel to clean cast iron; steel or cast iron to bronze, brass, and copper; and all these to nickel alloys.
- **Ideal for bearing applications and overlays** — where hardness and resistance to wear are essential factors.
- **Resists corrosion** — this quality is extremely useful when fabricating process-industry equipment.

Get a supply of these easy-to-use, money-saving aluminum bronze electrodes today. See your nearest Ampco distributor. Write us for latest Ampco-Trode 10 bulletin giving additional facts.

AMPCO

Ampco-Trode 10 is a product of

Ampco Metal, Inc.

Department S-10 Milwaukee 4, Wis.

W-101

the test plant and interviews everyone who has had any contact with the product, from operator and foreman to the plant's laboratory. A report on the progress of the test is sent to the home office. When testing is deemed sufficient, the salesman returns the product to the technical service department for inspection and if "bugs" exist, the necessary changes are made and the tests start over again. Otherwise, the part goes into production.

Pressure Vessel Research Program Under Way

Study of pressure vessels, one of the largest projects sponsored by the Welding Research Council of the Engineering Foundation, New York, is being undertaken in a research program costing $75,000 a year. According to Dr. A. B. Kinzel, chairman of the board of the foundation, the program aims at developing information and data which will lead to better, safer and more economically constructed pressure vessels.

Chairman of the project's general committee, made up of 87 representatives of manufacturers and users of pressure vessels, insurance companies, educational institutions and government representatives, is Walter Samans of Sun Oil Co., Philadelphia. The principal financial support is provided by interested manufacturers and users of pressure vessels.

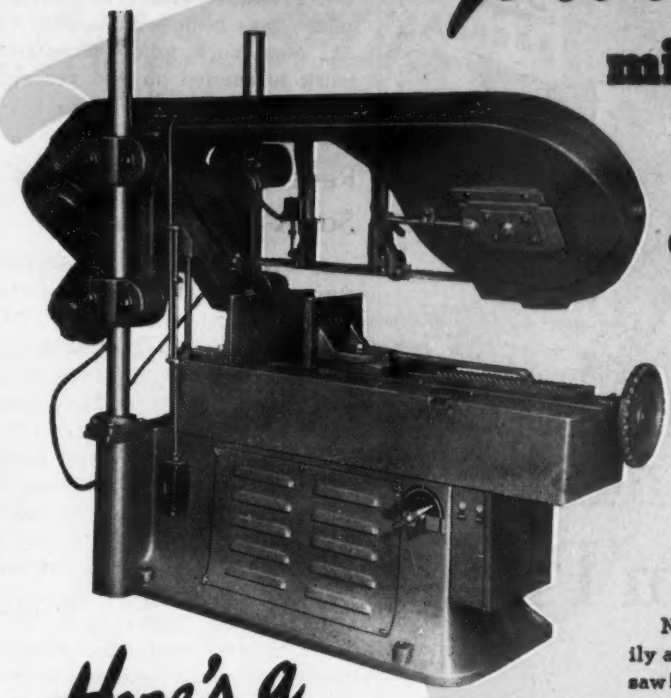
Studies are to cover four phases of the problem—design, fabrication and testing and inspection. The first named, design, has been allocated a sum of about $30,000, largest of the

"MIGHTY" ADHESIVE

An entirely synthetic adhesive material developed recently by B. F. Goodrich Co., Akron, O., for use in anchoring automotive brake linings is reported to withstand a shearing pull of 11,000 pounds. According to the company, its use enables brake linings to be used until worn to the brake shoe. Starting this fall, one auto producer is planning to use the material on its commercial vehicles and ultimately on brakes of its passenger cars. At present material is being made in liquid or tape form, and requires a fairly severe "curing" period of applied heat and pressure.

Slash production costs

minimize waste on die block jobs with a WELLS No. 12



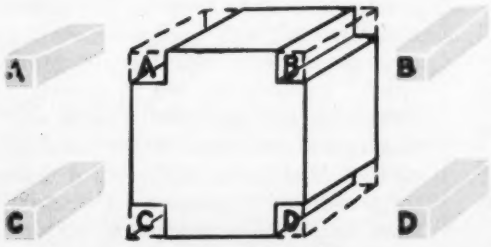
Here's a typical job

problem

To remove die block corner sections A,B,C and D, quickly and economically with a minimum loss of material.

answer

The Wells No. 12. It will do the job with eight fast, accurate cuts with negligible loss of stock . . . four small blocks are salvaged for making smaller dies.



Now you can handle die block cutting speedily and economically with a metal cutting band saw! The Wells No. 12 has all the features necessary to make it ideal for this type of work . . . the blade travels parallel to the bed at all times . . . positive-action limit switch permits cutting to any predetermined depth . . . electro-hydraulic controls feed blade into work at a constant pressure and return cutting head to any preselected height *automatically.*

The Wells No. 12 isn't limited to die block work alone. It's a rugged, heavy duty tool suitable for hundreds of cut-off jobs. Ask your Wells Saw dealer for further information or write direct.

Specifications

DIE BLOCK CAPACITY:
Maximum Cutting .....12¾" deep; 16" wide
Maximum Clearance, Bed to Blade .....18"

CUT-OFF CAPACITY:
Rectangular .....12" x 16"
Rounds .....12¾" O.D.

SPEEDS, Selective: .....50, 90, 150 ft. per min.

MOTORS: .....⅓ H.P. & ¾ H.P.

WEIGHT, Approximate .....1750 lbs.

Wells SAWS

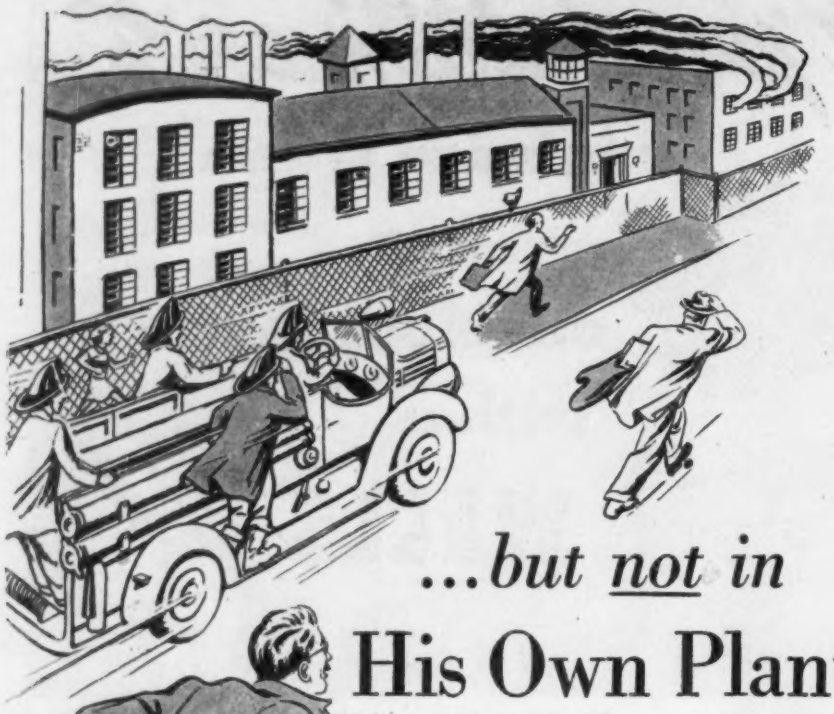
Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

Everybody loves to see a fire



...but not in His Own Plant

There's something exciting about a fire, but when it's your property, that's another story. Stop fires when they start with C-O-Two fire equipment. Prevent costly damage. C-O-Two is clean, modern, carbon dioxide fire protection. It's versatile; C-O-Two is used to protect electric and flammable liquid hazards of every size. It is non-conducting, non-deteriorating, harmless to the most delicate instruments.

See that your plant has C-O-Two protection. Check your dip tanks, bake ovens, spray booths, rheostats, switch panels, and other electric equipment. Don't overlook blueprint and record vaults. Then write us for a catalog or let one of our expert representatives help you plan complete C-O-Two fire protection.

C-O-TWO

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 NEW JERSEY
Sales and Service in the Principal Cities of United States and Canada
Affiliated with Pyrene Manufacturing Company

four. This program has already started at Purdue University. The fabricating division has been allocated approximately $20,000; some of this work is already underway at Lehigh University. A central office for the Pressure Vessel Research Committee has been set up at 30 Church St., New York, where administrative work is carried on and research results correlated.

Redesign to Magnesium Saves Aircraft Weight

A 9 per cent weight reduction and elimination of 337 parts was attained by Beech Aircraft Corp., Wichita, Kan., in redesigning control surfaces of the Beechcraft Bonanza to an all magnesium structure. Tests made on the magnesium assemblies, which included flaps, ailerons and elevators, demonstrated that the magnesium control surfaces were able to withstand a load from two to four times greater than the load for which they were designed, according to Dow Chemical Co., Midland, Mich.

Six control surfaces formerly required 439 parts weighing 54 pounds, but the use of the light metal reportedly brought these figures down to 102 parts and 48 pounds. As a result of the reduction in the number of parts, a similar reduction in tooling was made possible. For example, the number of tools required to fabricate the elevators dropped from 102 to 45, while the lightness of the metal saved 21½ manhours in manufacturing the pair of elevator surfaces.

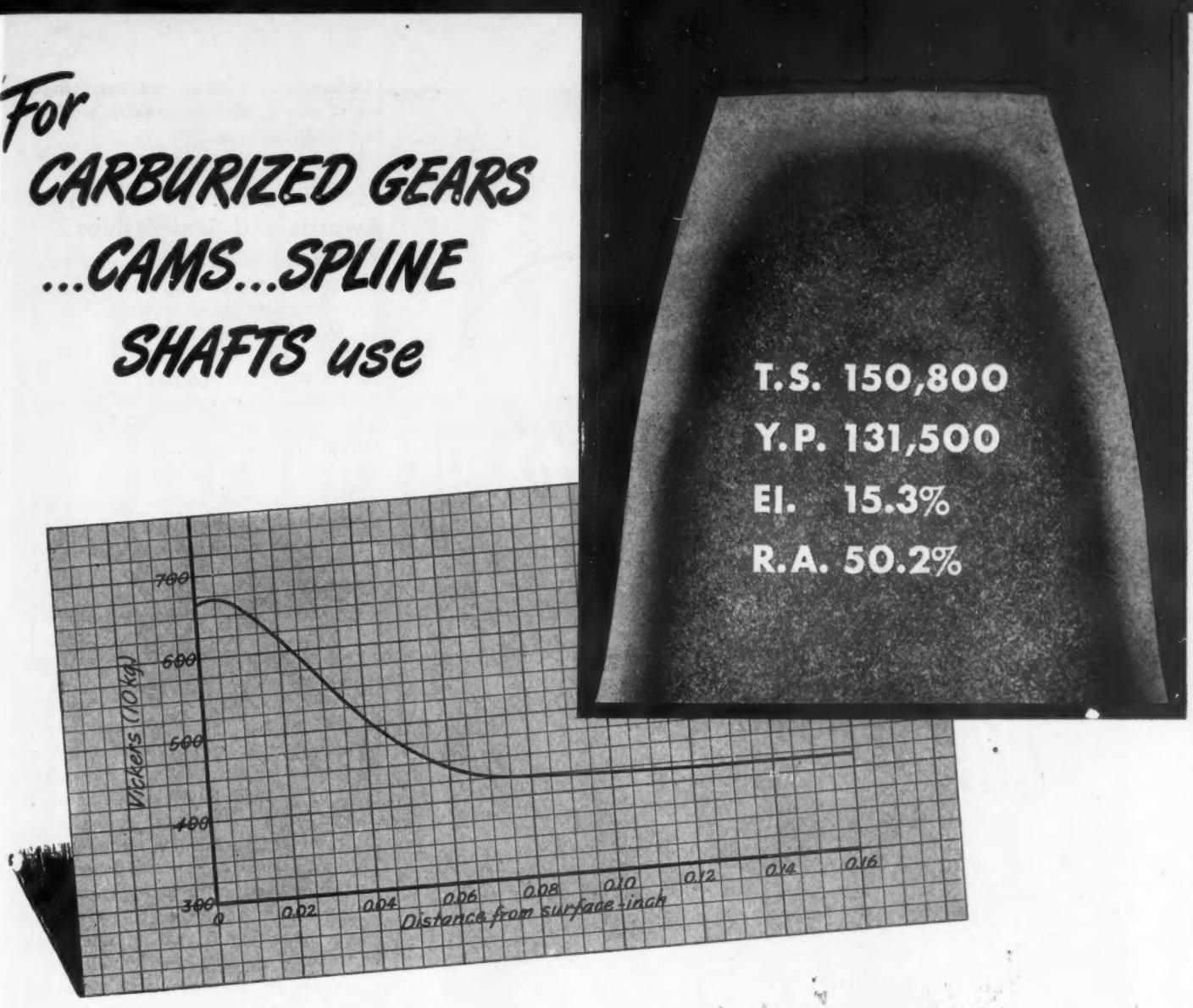
All-Purpose Paint

Made with a corrosion proof, synthetic resin vehicle and an aluminum powder that leafs well, an aluminum maintenance paint, developed by Prufcoat Laboratories Inc., 63 Main Street, Cambridge, Mass., provides protection against acids, alkalis, and water and will seal under average surface conditions. Drying in a matter of minutes, it makes a satisfactory base coat for ordinary paint.

Immune to Chemical Attacks

Made entirely of aluminum, the 30-gal drum manufactured by Reynolds Metals Co., Louisville 1, Ky., does not react with many chemicals, it being immune to attack and its contents not being affected by the container. Meeting ICC specification 42D, the drum weighs 34 lb, is 30½-in. high and 18 in. OD, excluding 1½-in. high reinforcing rings. Minimum wall

For CARBURIZED GEARS ...CAMS...SPLINE SHAFTS use



AISI A 6120 CHROMIUM-VANADIUM STEEL

TOUGH, ductile core for impact resistance—strong, hard case for wear-resistance—firm bonding for close integration of case and core. These essential properties of carburizing steel are obtained to a high degree in AISI A 6120 Chromium-Vanadium steel.

The outstanding core properties are demonstrated by the values (the average of six tests) superimposed on the accompanying macrograph of a gear tooth cross-section. These properties were obtained by the following heat treatment of 1-inch rounds: pseudo-carburize at 1675°, oil quench from pot, and temper at 350° F.

The fine-grained structure of the core, which is characteristic of all vanadium steels, and the firm integration of case and core are clearly shown in the macrograph.

The strong bonding is also graphically presented by the chart, which shows the gradual decrease in carbon penetration from case to core.

The excellent properties of these three—case, core and bonding—make A 6120 Chromium-Vanadium carburizing steel ideal for such vital parts as gears, cams, splines and bearings.

If you have a carburizing problem, our metallurgists will be glad to work with you in reaching a satisfactory solution.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N.Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

Your
ASSEMBLY SAVINGS
also
CUT SERVICING TIME
THE HOURS YOU SAVE in factory assembly by simply peeling precision laminations for accurate fitting of machine parts will be repeated by your users on every service adjustment. Want performance data and photo chart of applications?
Laminum shims are cut to your specifications, but shim materials for repair are sold through your industrial distributors.
Laminated Shim Company, Incorporated
87 Union Street • Glenbrook, Conn.
LAMINUM
THE SOLID SHIM THAT peels FOR ADJUSTMENT
2215

thickness is 0.102-in. Rolling rings are of strong aluminum alloy, welded to the drum.

Welding Foundation Gives Awards and Scholarships

Rules of the annual engineering undergraduate award and scholarship program have been announced by the trustees of the James F. Lincoln Arc Welding Foundation, Cleveland. This program started in 1942 but was interrupted by the war. Two interdependent plans are contained in the program—the award plan and the scholarship plan.

Under the award plan, engineering students of various engineering schools and colleges will submit papers on arc welded design and the use of welding in maintenance of machines and structures. Under the scholarship plan, scholarships will be allocated to the schools in which the three highest award recipients under the award program are registered.

Awards for papers will be as follows: One each of $1000, $500 and $250; four of $150; eight of $100; twelve of $50; and fifty of $25. The institutions in which the three top awards are made to students will receive amounts of money equal, respectively, to the awards. It is stipulated that these amounts are to be used for the purpose of scholarships in the departments in which the award students are registered. The department of the institution in which the first award winner is registered will receive $1000 for four annual scholarships of $250. In like manner, the $500 is to be divided into two annual scholarships of $250.

In rating the merits of the papers

SHEDS WATER FROM METALS

Water films from the surface and crevices of metals is displaced by a liquid developed by Enthone Inc., New Haven, Conn. According to the company, the development possesses very low interfacial surface tension against metal, and is particularly advantageous for drying work after silver, chromium or other metal plating operations where solids, remaining on the work, may cause staining. It also is valuable for drying work after pickling, or when solids deposit on work from hard water.

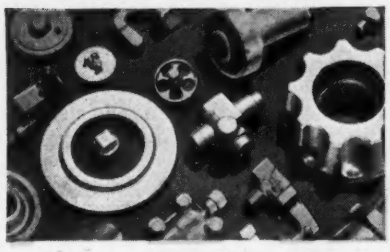
Scovill NON-FERROUS FORGINGS

When SCOVILL becomes your METAL-PARTner, YOUR HIGHEST STANDARDS FOR CHROME-PLATED PARTS CAN BE MET

After machining, the top surface of this sink drain flange for a garbage disposal unit is highly polished and chrome plated. Adherence of the plate over a long service life is a prime requisite. Originally made as a sand casting, the inherent porosity of the casting plus tool wear in machining operations resulted in a surface unsuitable for good plating. Brass pressure die castings were also tried and rejected because of porosity. The solution was this SCOVILL forging, which has dense grain structure, relatively thin sections, easy machinability, and complete absence of porosity. Plating troubles were minimized and the required plate adherence obtained.

CHECK WITH SCOVILL

Maybe *your* non-ferrous metal parts would benefit by a change in design or method of production . . . Scovill's long experience in forging will prove of real value to you as it has to others. It costs nothing to find out about the advantages of making Scovill *your* METAL PART*ner*. Just fill in the attached coupon and mail to: Scovill Manufacturing Company, Waterbury 91, Conn. *Export Department:* 405 Lexington Avenue, New York 17, New York.



Please send me information about your metal-working facilities. I am interested in non-ferrous forgings for the applications checked:

- ☐ Aircraft
- ☐ Automobiles
- ☐ Band Instruments
- ☐ Blow Torches
- ☐ Cameras
- ☐ Communication Equipment
- ☐ Compressed Gas Cylinders
- ☐ Fire Extinguishers
- ☐ Household Appliances
- ☐ Industrial Instruments
- ☐ Plumbing Goods
- ☐ Pumps
- ☐ Valves
- ☐ Welding Equipment

Other applications .....

.....

SCOVILL MANUFACTURING COMPANY
Forgings Division
20 Mill Street
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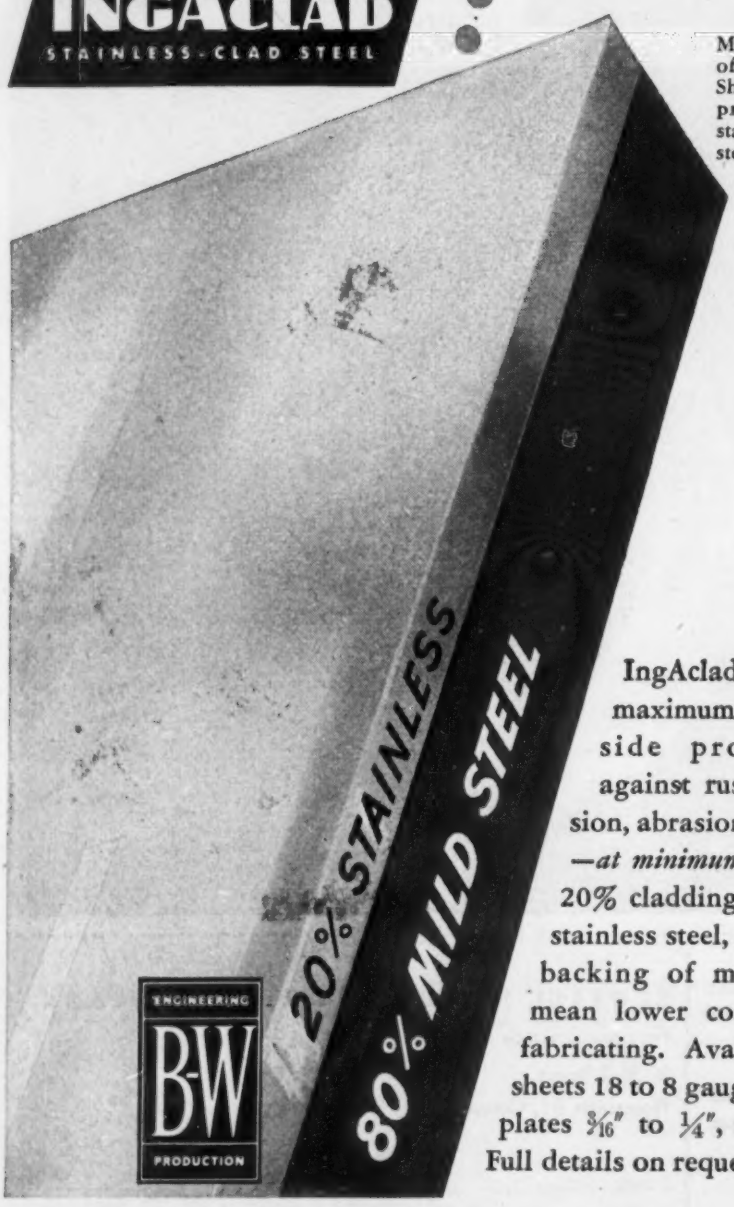
Name .....

Company .....

Address .....

for
any
application
where
stainless steel
is needed
only on the
contact side
nothing beats

INGACLAD
STAINLESS-CLAD STEEL



Magnified view of IngAclad Sheet to show proportion of stainless to mild steel.

IngAclad provides maximum contact-side protection against rust, corrosion, abrasion, erosion —*at minimum cost.* Its 20% cladding of solid stainless steel, and 80% backing of mild steel mean lower cost, easier fabricating. Available in sheets 18 to 8 gauge, and in plates 3/16" to 1/4", inclusive. Full details on request.

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submitted, the jury of awards will give consideration to: Ingenuity and originality displayed; clarity of design and description; practicability of the conversion described; technical completeness and thoroughness; statement of advantages such as savings in time or money or improvements in performance and social advantages, of the construction, or design, described in the paper, over other methods; and presentation (correct use of English, quality of illustrations, neatness, succinct expression).

Rules of the program were reviewed and approved by the deans of engineering of 14 engineering colleges, the foundation states. Papers must be postmarked not later than midnight, May 15, 1948.

Gas-Free Silver Powder

Chemically precipitated, white in color, free flowing and 99.97 plus per cent pure, type MR 3 fine silver powder, made by Alloymet Mfg. Corp., 3 Grand street extension, Brooklyn, N. Y., contains no free acids or alkalies and is unusually gas free. Particle size is from minus 200 to plus 400 mesh and grains are in a fully annealed condition. Their irregular shape produces an interlocking effect upon pressing. High density causes it to flow readily into odd shaped dies.

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Designed by Liquid Conditioning Corp., 114 East Price street, Linden, N. J., a new Liquon hot lime soda water softener has a deep sludge bed through which the raw water percolates upwardly, assuring thorough contact of water with lime and soda ash. Magnesium hydroxide in the sludge accomplishes silica removal. Five types of softeners are available for a selection of different make-up requirements up to 100 per cent and for de-aeration of make-up or of both make-up and condensate either separately or together.

Simplifies Computations

Computation is simplified with the Deci. log log slide rule, announced by Pickett & Eckel Inc., 5 South Wabash avenue, Chicago 3, whose scales, on front of the rule, are so arranged that only one setting of the hairline gives each result its square root, cube root and logarithm. Scales read from one ten-billionth to ten billion and give decimal point location. Log log scale on back gives five readings with each

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Udylite Plating Barrels and Udylite Automatic Plating Machines are reducing costs and improving the product at the Metal Finishing Division of Pyrene Manufacturing Company.

Makers of the famous Pyrene Fire Extinguishers and Pyrene Tire Chains plate a variety of their own small parts in Udylite Plating Barrels. In addition they do a large volume of diversified plating work for other concerns.

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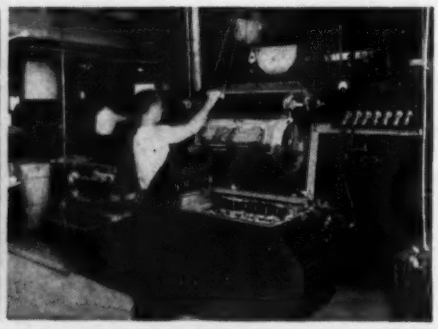

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hairline setting. Rule is made of magnesium alloy with permanent plastic surface.

Rolled Electric Steel Manual Compiled by AISI

Flat rolled electrical steel is the subject of section 26 of the Steel Products Manual published by the American Iron and Steel Institute, New York. Covered in the 97-page manual is varied information on the manufacture and characteristics of the steel, along with other information.

The five parts of the manual are as follows: History, definition, manufacturing processes and types; magnetic properties; manufacturing practices; testing; standard methods for packaging, loading and shipping. An alphabetical index is included along with tables, graphs and line drawings.

Fool-Proof Extinguisher

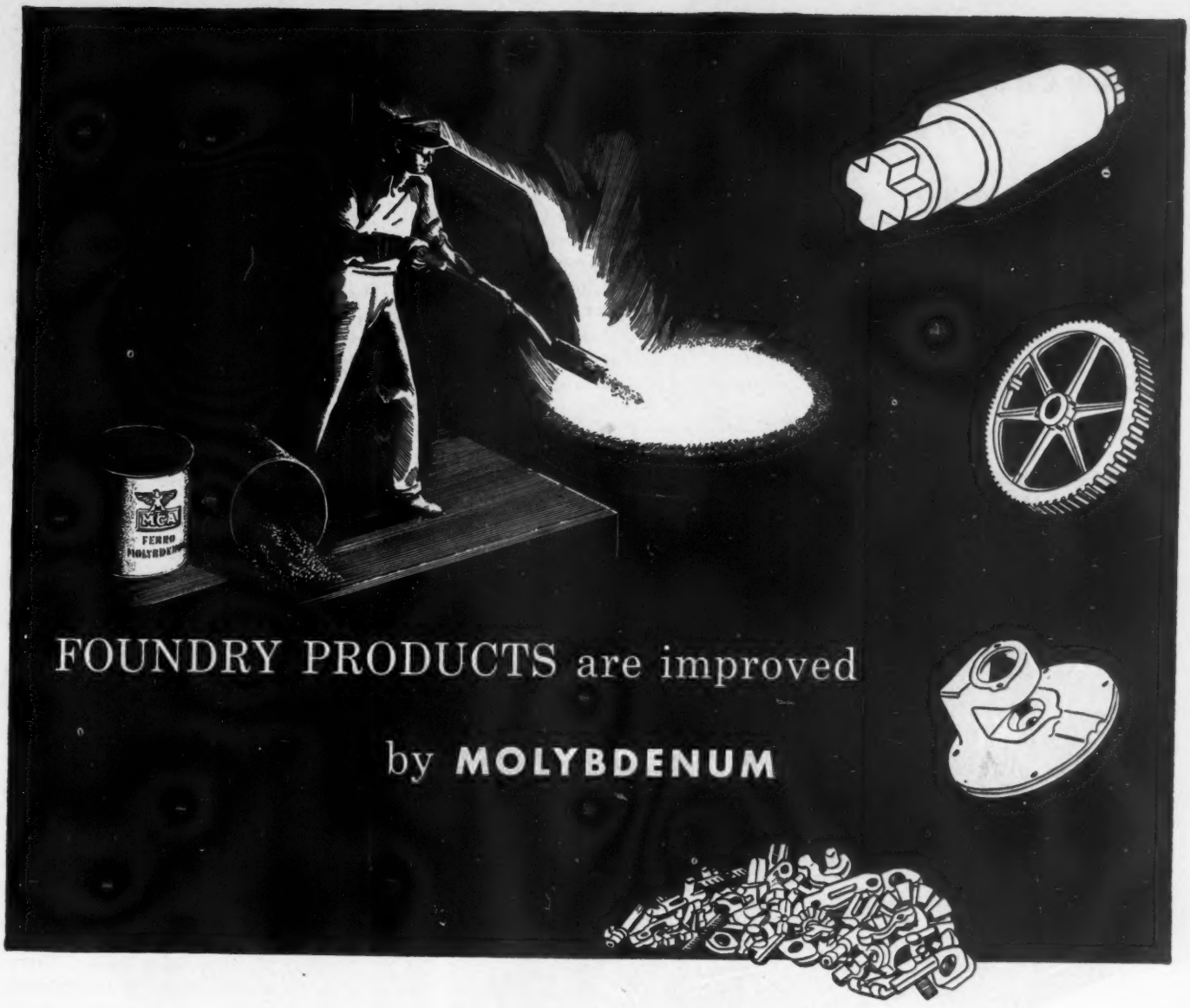
Sealed stopper construction built into the top of the new fire extinguisher made by American-LaFrance-Foamite Corp., Elmira, N. Y., prevents the chemicals from mixing until needed. It produces a chemical foam equal to approximately 10 times its own capacity. With a stream range of from 35 to 40 ft, it will stop oil and gasoline fires and prevent reflashing.

Acid Loss Minimized

To minimize chromic acid loss, reduced heat waste and help protect workers, Hanson-Van Winkle-Munning Co., Matawan, N. J., is making chrome spray floats, which when laid on the solution to a thickness of about 1 in., form a blanket which cuts escaping spray to a minimum. Floats are yellow polystyrene tubes, 2¾-in. long, are practically indestructible and may be used indefinitely.

—o—

With many special uses in plating and similar operations, such as insulating supports for acid and electrolytic tanks, solid glass blocks, 5 x 5 x 2⅝-inches are again being manufactured by Pittsburgh Corning Corp., Pittsburgh. A war-time casualty, the 5.7-pound block has an ultimate compression strength of 80,000 pounds per square inch under uniform loading and a modulus of elasticity of 10 million pounds per square inch.



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Where uniform strength in light and heavy sections is important . . .

And where economy of weight, dimension, or basic materials is a ruling consideration . . .

Molybdenum is entering more and more into the composition of modern castings.

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MCA

SUCCESS IN STEEL TREATING

Depends on Experience and Common Sense

By W. R. BENNETT
Bennett Steel Treating Co.
Brattleboro, Vt.

TWO requisites for success in heat treating steel are experience and common sense. One should have very little patience with the steel treater who hands you a die cracked in hardening and assures you it was heated correctly, properly quenched and he knew of no reason why it should crack unless the steel was at fault. A metallurgical chemist might make a microscopic examination of the fracture and advance a number of reason for the failure but probably could not definitely lay his finger on the actual solution. However, the steel treater who has the "intestinal fortitude" to admit failure and will check every phase of the various operations will be in a position to prevent its reoccurrence.

It should be pointed out that while the names "steel treater" and "steel hardener" appear to be synonymous, a steel treater should have sufficient experience and judgment to enable him to carry on successfully in any large factory or run a custom steel treating plant. A hardener who has devoted a number of years in hardening nothing but cups and cones for ball bearings should become proficient in that work, but he has by no means acquired sufficient experience to pass as a "steel treater."

Uniform Heating Important

Every steel manufacturer stresses the point that the piece to be hardened must be heated uniformly. It is not a difficult matter to heat steel to a uniform temperature. However, there is no heating medium of any description that will heat steel uniformly throughout its entire heating phase. True, they will all heat to a final uniform degree but the piece is not being uniformly heated. This is due to the fact that the thinner parts, those which are susceptible to heat, will take on temperature prior to the heavier or more solid body. Therefore, as a precaution, it is advisable never to allow the thinner parts to reach the critical or quenching temperature, until the heavier portion conforms with the faster heated parts.

It is good practice to hold the temperature of the oven at a point some 40 or 50 degrees below the predetermined quenching temperature until the entire piece has reached oven temperature and then, gradually increase oven heat to the desired quenching or critical point. This method tends to minimize the time of soaking the lighter portions at a hardening heat and enables the operator to quench at a more uniform temperature throughout than is otherwise possible.

Aside from temperature control, there is another factor pertinent to the successful operation of a hardening furnace oven which bears equal importance—atmosphere control. The fundamental requisite for correct atmosphere conditions is the exclusion of excess air. Inasmuch as this is true, it would be to our advantage if we were able to obtain and maintain correct atmosphere conditions indefi-

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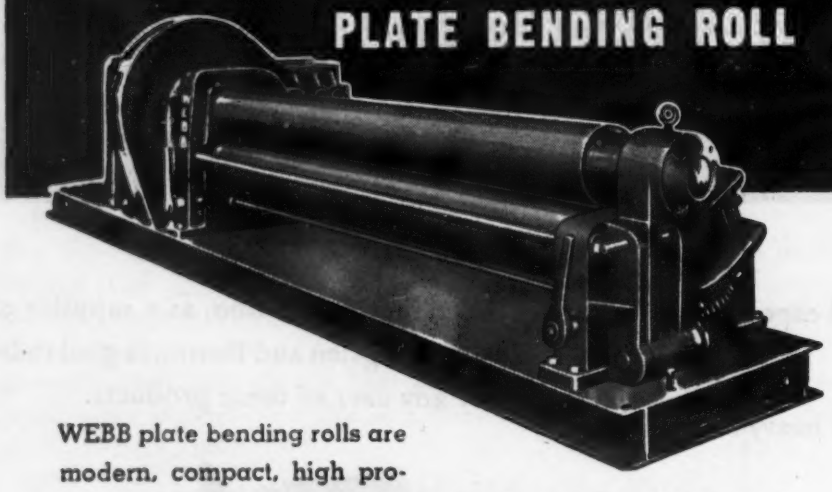

WEBB plate bending rolls are modern, compact, high production machines. Made in a complete range of sizes and capacities, these rolls are being used on high quantity production rolling in all types of metal shops throughout the United States. These rolls are made in both pyramid and pinch types.

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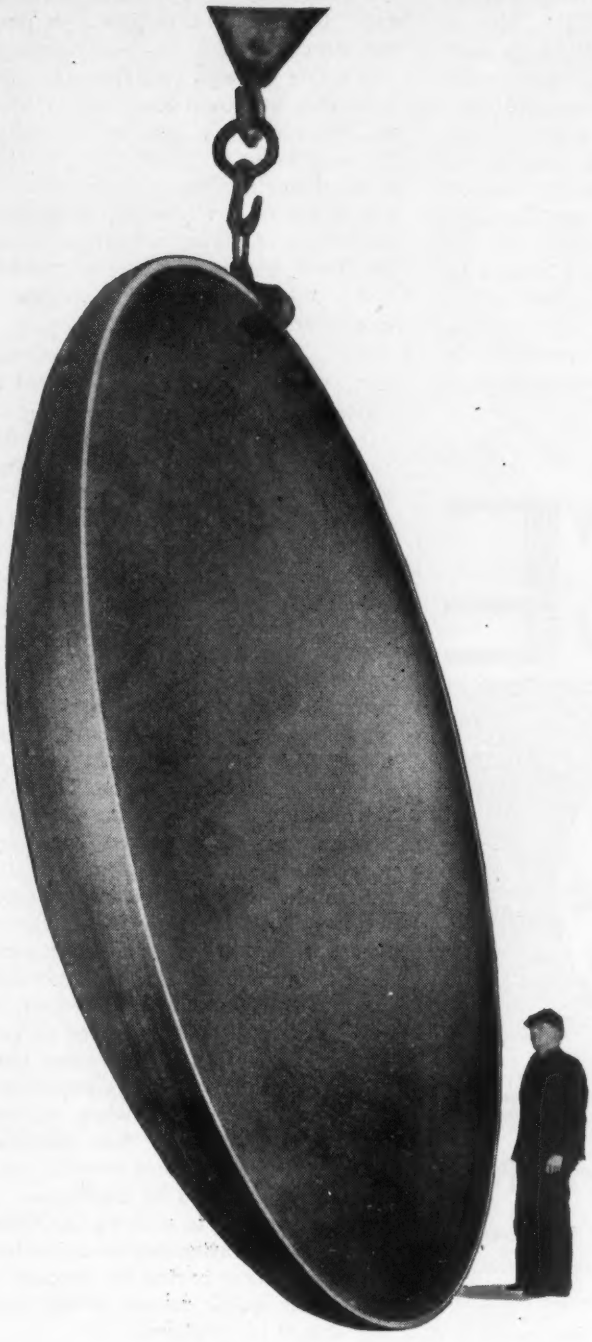

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nitely without depending on automatic controls which fail to function as desired under all conditions.

Shock is what steel experiences when quenched. The faster the cooling medium functions, the greater the shock. Cracks and distortion are to be the direct result of quenching. If this is entirely true, why not endeavor to diminish or lessen the shock, even when salt brine is employed as a cooling medium? If it is true that thin or protruding parts will take on heat before the heavier body, it naturally follows that heat will be dissipated from parts of like nature, with much greater celerity.

Let us take for example, a slab or angular milling cutter made from carbon steel. These cutters cut only on the teeth and after repeated grindings they are, in many cases, reground to a smaller size and rehardended. A milling cutter need be hardened only on the cutting teeth. It is not necessary that they should be hard at the bottom of the milled flutes, neither is it necessary or advisable that the cutter hub should be hard. Why then, should the cutter be left in the quenching medium until it is hard throughout? Why not submerge it in the cooling medium a few seconds and then transfer it quickly in a tank of oil, thus allowing the remaining heat in the cutter to be dissipated in the oil? This method reduces the primary quenching shock to a minimum, eliminates all danger of cracks, is martensitic at the teeth but semi-austenitic at the hub. This same rule also applies to carbon steel blanking dies.

Retarded cooling after a piece has been hardened and drawn will add to its toughness, without decreasing its hardness. Some manufacturers advocate this method because they know of none better. However, there is a method which will attain better results and with much lower cost than the long draw back. Let it be called the "slow cool down."

Oven or Oil Tempering Bath

Specifications calling for a 400° draw back for a period of 5 hours on a die already hardened. An oven or an oil tempering bath may be employed for the operation. The oven containing the piece is gradually brought to the required heat and maintained for a period of 5 hours. The piece being heated has reached a thoroughly saturated heat equivalent with bath or furnace temperature long before the time specified. It is, however, allowed to remain its full time and either quenched or permitted to cool in air at room temperature. It has been my experience that the long draw when accompanied by either of the described cooling steps, does not develop, particularly as related to toughness. It is not necessary to prolong the drawing after saturation has been reached. A much longer period for cooling by either the quick quench or air cooling should be employed.

Insulation, when properly applied, will maintain heat or cold over an extended period of time. It is slow cooling that develops toughness and in order to accomplish this it is only necessary to place the piece in a box, after its removal from the drawing furnace, and pack well with ground asbestos or any other suitable insulating material. This applies to any steel. A piece weighing 5 pounds, subjected to this treatment, will be warm to the touch after about 12 hours. Results: No furnace hold-ups, no added costs and a tougher tool.

Straight oil hardening manganese steels show a marked tendency to soft exteriors, although hardening temperatures and time for heating, in each case, may have been correct. It is an easy matter to attribute this

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New Design

A SMART-LOOKING STARTING SWITCH

for Motors of One Horsepower or Less

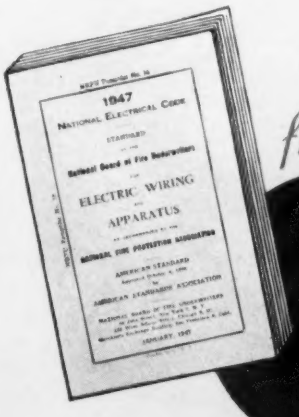
This popular manual starting switch has been redesigned . . . inside and out. Its attractive plastic enclosure harmonizes with the streamlined contours of modern appliances and machines. There is more wiring space . . . more accessible terminals . . . more protection for motor and operator.

Meet 1947 N.E.C. Code requirements with this new Bulletin 600 Switch . . . it is a sales asset to any motorized machine.

Overload device operates on "soldered ratchet" principle. Impossible to hold switch closed under sustained overload. Easily reset with switch lever after overload is cleared.

Bulletin 600 Starting Switch is a manually operated snap switch with thermal overload device. Essential for most small motor applications. See 1947 N.E.C. Ruling, below.

ARTICLE 4322-C: ONE HORSEPOWER OR LESS, AUTOMATICALLY STARTED. Any motor of one horsepower or less which is started automatically shall be protected against overcurrent.



from 1947 NATIONAL ELECTRICAL CODE:

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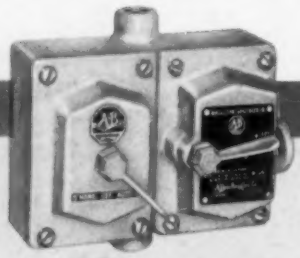
STARTING SWITCHES FOR SMALL MOTORS

See Next Page

BULLETIN 600 Manual Starting Switches for Motors up to One Horsepower

Available in a Wide Variety of Forms and Enclosures

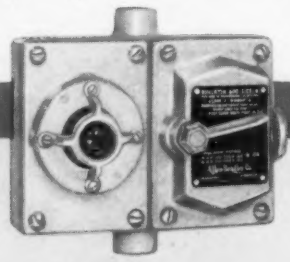


SELECTOR SWITCH

For 3-way "HAND-OFF AUTOMATIC" control. Selector switch on left; Bulletin 600 starting switch on right. Two-way units also available.

SAFETY SEAL

The cast iron enclosure of this Bulletin 600 starting switch has machined seal between cover and base for hazardous gas applications.



PILOT LIGHT

In this form, a red pilot light is combined with Bulletin 600 Switch in cast iron enclosure. For watertight or weather-proof pilot control service.

GENERAL PURPOSE

The plastic enclosure of this Bulletin 600 starting switch is in harmony with the streamlined appearance of the most modern equipment.

These Bulletin 600 Manual Starting Switches show some of the Allen-Bradley switching units extensively used for air-conditioning and refrigeration service.

OVERLOAD PROTECTION—In spite of their extreme compactness they provide accurate and dependable overload protection for motors under one horsepower. Thermal elements for the overload device are available in over three dozen ratings from 0.2 ampere to 12.7 amperes—for accurate overload protection. Meets all N.E.C. code requirements.

NO CONTACT MAINTENANCE—The silver alloy contacts require no cleaning, dressing, or filing, since any oxides that may form are good conductors. Low contact resistance is always assured. Just install these Allen-Bradley starting switches . . . and forget them.

MANUAL SWITCHES FOR MOTORS UP TO FIVE HORSEPOWER

For installations up to 5 hp, 220 v., 7½ hp, 440 v., use Bulletin 609 Manual Starting Switches. Provide accurate overload protection and years of trouble-free operation. Standard enclosures are available for every service.

This cast iron enclosure, with bolted machined covers, is for use in explosive atmospheres. Other standard Allen-Bradley enclosures are available.

Bulletin 609 Across-the-line Starters are operated mechanically with START and STOP buttons. Cannot be used for automatic control. For such installations, use Bulletin 709 Magnetic Starters with 2- or 3-wire control.

Bulletin 609 Manual Starter in flush type pressed steel enclosure is designed for flush mounting in machine housings. Makes attractive installation.

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STARTING SWITCHES FOR SMALL MOTORS

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SEE OTHER SIDE

condition to decarburization. Decarb, however, is not the answer. It is well to consider the opposite. This condition is the result of faulty oven atmosphere. A highly reducing atmosphere tends toward a carburized surface thus throwing out of balance, carbon and manganese, with a resultant slightly austenitized surface being produced which is soft to the file. A fire running close to the dividing line, possibly on the lean or oxidizing side, will develop a martensitic structure, the hardest known micro constituent, and the piece after hardening, will show no evidence of soft exterior.

The commercial steel treater receives an order reading: One oil hardening die to be treated. To the customer, it means just what it says —"oil hardening." To the steel treater, it may mean regular oil hardening manganese steel, high carbon, high chrome, or high speed steel. All are oil hardening, all require different temperatures for hardening.

Sparking On a Wheel

Practice of sparking on a wheel, wherein one is able to note the color of the spark, the distance from the wheel the spark breaks and size and formation of the spark at the point of breaking, should be in universal use. However, there is another method for determining spark, equally as efficient and which does not require the use of a grinding wheel. Rub a clean, free cutting file over the steel, holding a lighted match under the file as it leaves the piece. The chips falling from the file will ignite and develop sparks equally as well as does a wheel.

Consider a cold swedging die, made from 0.85 carbon tool steel. The dies are 2 inches in diameter and have an impression for forming a ½-inch ball. After the recommended procedure for hardening, it shows a 62 or 63 rockwell test. Now after these dies have been in operation for a comparatively short time, small cracks develop at the bottom of the impression. Their continued use cause a sinking where these cracks appear. The perhaps reasonable supposition follows: The die is too hard. If not, why should it crack? The next pair is drawn lower after hardening and the result is the same. The steel manufacturer's instructions have been followed to the letter. The conclusion is that this grade of steel does not apply on this kind of work.

Analysis of the problems shows that the dies crack and sink. Inasmuch as heating instructions have been followed, as fine a granular construction as this particular steel will develop has been produced. Were this steel heated in like manner and made into a circular forming tool, it would stand up and give good results.

The swedging tool, however, is not a cutting tool. It must withstand pressure and a blow and the advice given for treating dies of this nature is incorrect and does not apply. Not grain size, but depth of hardness penetration is being looked for. Consequently, the primary heating temperature must be increased to a point that will, after quenching, give a greater depth of penetration of hardness, even at the expense of grain size. The dies did not crack because they were too hard: They did however, crack because there was not sufficient penetration of hardness to hold their form and consequently, sunk.

As much attention should be paid to preheating high speed steel as is, or should be paid to final or high temperature heating. Many steel treaters take for granted that the preheat specifications for this initial phase are correct and proceed to follow them more or less as a matter of habit.

Advocated temperatures for preheating are sufficiently high to in-

(*Please turn to Page* 204)

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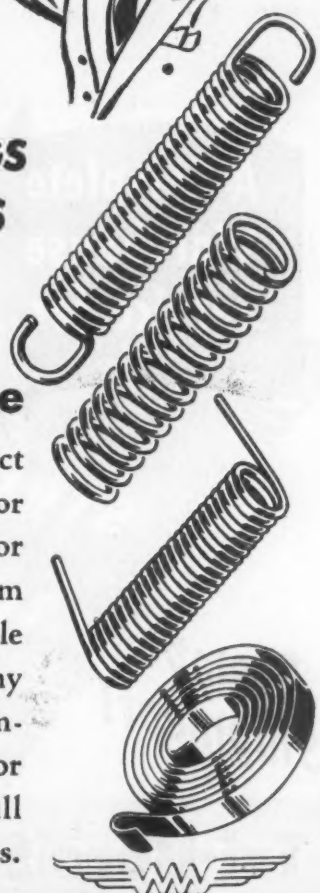

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Abrasion Resistance of White Cast Iron

Improved by Suitable Alloying

WHITE cast iron, because of its carbolic structure, possesses unusual abrasion resistance. It is used widely for those services where abrasion is a major concern and impact a minor consideration. Speaking before the Salt Lake City, Utah, meeting of the American Society of Mechanical Engineers recently, Kenneth A. De-Longe of the development and research division, International Nickel Co. Inc., New York, pointed out that significant improvements in properties and service performance of white iron can be brought about by the use of alloys.

Engineering properties (strength and toughness) of white iron with a nominal addition of 4½ per cent nickel and 2 per cent chromium are 25 to 50 per cent greater than those of the unalloyed product—while service performance is usually 100 to 200 per cent greater, he stated. When suitably alloyed, the matrix structure of the iron is changed from the usually pearlite to hard martensite and resulting iron has a hardness range of 550 to 725 brinell.

Two prime factors determining the abrasion resistance of metals are hardness of individual constituents in the structure and the tenacity with which adjacent particles are held together. It is the optimum combination of these two factors that is important in most industrial service, Mr. De Longe said. Generally speaking a high level of metal hardness infers good abrasion resistance.

Resilience Compensates for Hardness

Outside of the field of metals there are cases, however, where toughness or resilience compensates for lack of hardness, as for example, the ability of rubber to resist wear under certain conditions. Low carbon steel is considered a tough material but it cannot be considered an abrasion resistant material, probably because its toughness is not adequate to compensate for its low hardness.

Abrasive wear results from a scratching or scouring action usually supplemented by impact loads which vary over a wide range depending upon the type of service. In the absence of impact, maximum hardness of the abrasion resisting surface usually gives minimum metal wear. As impact loads increase the need for toughness increases, to avoid premature failure by breakage and to achieve maximum abrasion resistance. If toughness is not increased as the impact loads mount, metal wear increases because of local chipping, spalling and cracking at the point of impact. The impact resistance of iron and steel increases as the hardness decreases; hence these two properties must be balanced to arrive at optimum abrasion resistance, the speaker said.

High hardness of martensitic white irons demands exacting measurement of this property. It is essential that a tungsten carbide ball be used in the brinell test on martensitic white iron. The usual hardened steel ball will deform under the applied load of the test and give a hardness value 25-75

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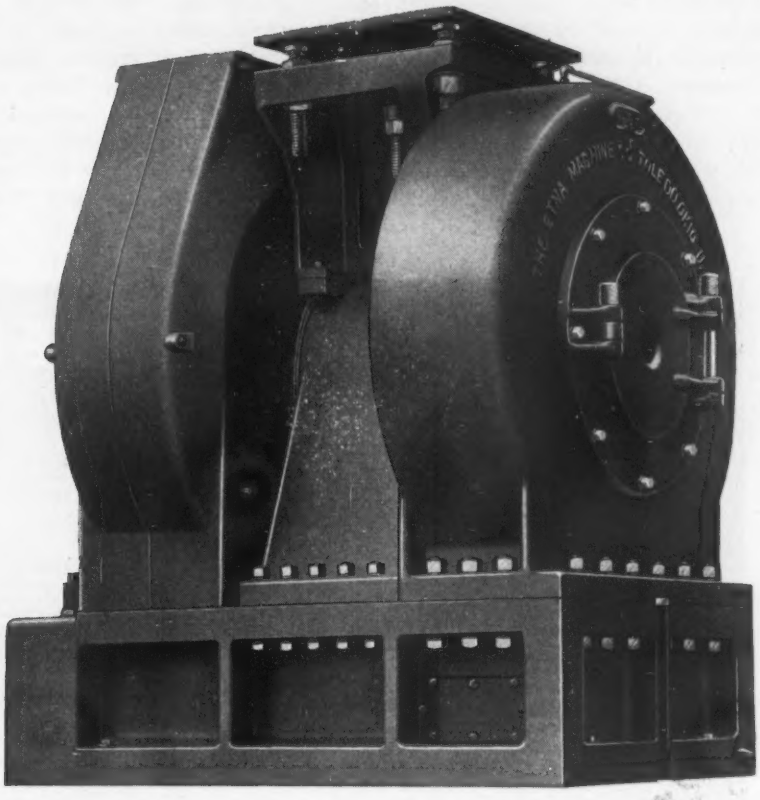

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- Hammers, rolls and inner ring of heat-treated alloys.
- Motor is mounted over the machine on an adjustable bracket, the power being transmitted by V-belts.

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3407 Maplewood Ave., Toledo 10, Ohio

points too low.

Most commonly used martensitic white iron contains nominally 4½ per cent nickel and 2 per cent chromium and is marketed under the trade name Ni-Hard. Strength, toughness and hardness of both pearlitic and martensitic white iron are improved 20-50 per cent by chill casting as compared to sand casting. This improvement is due to the refinement in carbide size resulting from the rapid freezing rate of the metal in contact with the chiller. Another advantage of the chilled casting, according to Mr. De Longe, lies in its longer service life which is attributed to the greater cracking and spalling resistance of the fine carbides and to the fact that with improved strength, a given part will wear thinner before failing.

Martensitic white irons normally contain small amounts of soft austenite which improve bending and impact properties. Tests show that under impact this retained austenite transforms to hard martensite at the wearing surface. In the instance of shell liners in the 6½ x 15-foot mills using 2½-inch rods at the concentrator of International Nickel the work hardening which occurred at the liner surface amounted to 85 points brinell.

Service tests under a wide variety of operating conditions demonstrate the merit of martensitic white iron. Most widespread use of this alloy iron is in the mining industry for such castings as grinding balls, ball and rod mill liners, scoop lips and feeders, classifier shoes, pump and flotation machine parts, stamp shoes and mortars, chute liners and roll shell cheek plates.

Large tonnages of martensitic white iron rolls have long been used for the hot and cold rolling of steel, and nonferrous metals. By reducing abrasive wear this type of iron has introduced greater efficiency and economy of operation in a variety of industrial applications including grinding of raw stone and fired clinker in the cement industry, grinding and working of clay and refractory materials, pulverizing of coal and conveying of wet and dry ashes, grinding of paint pigments and propelling of metallic shot and grit in cleaning operations.

Therm·O·flake *prevents waste*
BY REDUCING HEAT LOSSES...

MORE THAN 25% of Open Hearth fuel can be wasted through heat lost through brickwork and heat absorbed by cold infiltered air.

Therm·O·flake Insulations are designed to reduce heat losses and seal furnace walls against cold air infiltration. These are used regularly on hundreds of open hearth furnaces and save steel producers thousands of fuel dollars daily.

Therm·O·flake engineers will prepare an accurate fuel economy survey of existing furnaces in your plant and submit complete thermal data and recommendations for safe maximum insulation of any open hearth furnace, on request.

Illinois Clay Products Company
JOLIET, ILLINOIS

Exclusive Manufacturers of
Therm·O·flake
open hearth Insulation

Parts Carrying Dolly

Mounted on 4 in., full swivel, hard composition wheels, the Clean-Tote shop dolly for carrying machine and engine parts to be cleaned as well as other material moving jobs, is a product of Homestead Valve Mfg. Co., Coraopolis, Pa. It is made in two models, one of which features an interchangeable two-deck dolly with shallow metal tray and wire mesh cleaning baskets. Other model consists of expanded metal basket mounted on same type of wheels for easy handling on rough floors. Galvanized baskets are self-draining and easy to clean.

All Position Electrode

Developed for uses where great strength gained by heat treating after welding is desired, the improved No. 524 all position welding electrode, announced by Wilson Welder & Metals Co. Inc., 60 East 42nd street, New York 17, was designed primarily for the aircraft industry. Deposits made are not susceptible to cracking, even when preheating is not employed. Tensile strengths up to 150,000 psi may be obtained when deposited metal is heated to 1600° F, quenched in oil and drawn at 600° F for one hour. Electrode is offered in 5/64, 3/32, ⅛ and 5/32-in. diameter.

HERE'S WHY...

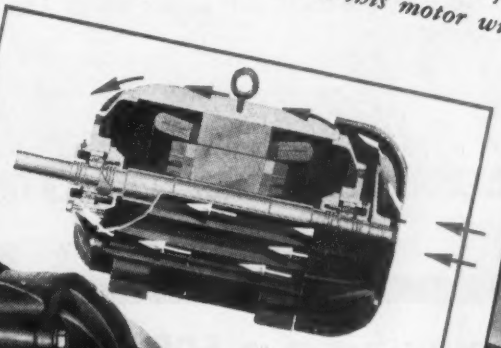
so many *Sealedpower* motors are being built today

More and more purchasers are specifying the Crocker-Wheeler Sealedpower Motor because they know it continues to operate year after year without "time out" for either cleaning or repairs. They know this motor doesn't have to be taken apart and cleaned periodically.

Crocker-Wheeler Engineers developed the Sealedpower Motor to permit continuous operation without shut-downs for the removal of dust and dirt from easily-clogged, hard-to-clean, double-walled passages found in conventional fan-cooled motors. The ventilating air that cools the Sealedpower Motor is always blown *outside* the frame, directed by heat radiating fins designed to properly guide and distribute the cooling air.

The vital operating parts are completely cut off from outside air. They run in a pocket of clean air, sealed in a frame of cast iron, immune to abrasive dust, corrosive fumes and excessive moisture.

The complete story of this exclusive Crocker-Wheeler design . . . the Sealedpower Motor . . . is contained in bulletin SL-300-2. Ask for your copy today. See what this motor will do for you.



Arrows show path of cooling air over exterior of frame.

CROCKER WHEELER

ELECTRIC MANUFACTURING COMPANY, AMPERE, N. J.

A Division of The Joshua Hendy Corporation

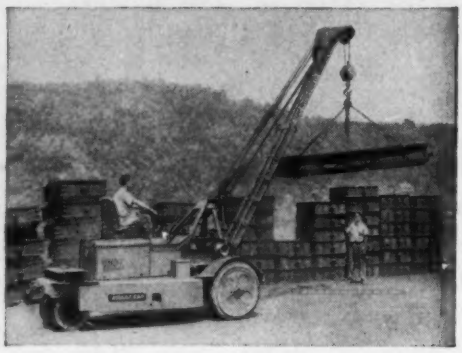
Branch Offices: Boston, Chicago, Cincinnati, Cleveland, Los Angeles, New York, Philadelphia, Pittsburgh — Representatives in Principal Cities.

QUALITY MOTORS AND GENERATORS SINCE 1888

CW-

KRANE KAR Handles Steel Stock and Forms at a Cost of Only 8¢ per TON

Case studies at foundries, forges, industrial plants, and shippers show **KRANE KAR** handles all types of loads at a cost of about 8c per ton. **KRANE KAR** speeds loading and unloading of freight cars, trucks, trailers; speeds tiering, stacking, and storing inside plant or in yard; speeds plant maintenance and repairs.



KRANE KAR lifts, swings, carries, and places loads of all shapes and sizes up to 10 tons. 9 to 37 ft. booms or adjustable telescopic booms; pneumatic or solid rubber tires; Gasoline or Diesel. Electric magnet, clamshell bucket, and other accessories available. Ask our nearest agent how to prune your materials-handling costs. Write for Bulletin No. 69.

THE ORIGINAL SWING BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 849 63rd ST., B'KLYN 20, N.Y.

If you have a SPECIAL PROBLEM

in any of these operations, where precision work is demanded and where greater production at man-hour savings is paramount—

• BORING—rough, semi-finish and finish • MILLING (special types) • STRAIGHT LINE DRILLING • UNIVERSAL ADJUSTABLE SPINDLE DRILLING • HONING • TAPPING • REAMING • COUNTERBORING • VERTICAL AND WAY-TYPE EQUIPMENT . . .

then a Moline Multiple Spindle Specially Designed machine tool is your answer. Moline tools are ruggedly built and engineered to fit your PARTICULAR requirements, they're made to last for years, they're easy to change over to other jobs, they do better work at less cost and stand up to it longer.

For YOUR special problem, go "HOLE-HOG," write us for any information you may need.

MOLINE TOOL COMPANY
100 20th Street Moline, Illinois

ASTM Schedules New York, Detroit District Meetings

American Society for Testing Materials with headquarters in Philadelphia, is announcing district meetings to be held in Detroit and New York. Subject of the Detroit meeting, being held during the 4-day sessions of ASTM committee D-2 on petroleum products and lubricants, is "Petroleum Products as Related to Automotive Uses". To be held in the Rackham Memorial Building on October 8, with the Engineering Society of Detroit co-operating, the meeting will hear papers presented by C. M. Larson, chief consulting engineer, Sinclair Refining Co., New York and W. M. Holaday, director of Socony-Vacuum Oil Co. laboratories, New York. Technical sessions begin at 8:00 p.m., preceded by an informal dinner at which the society's president, T. A. Boyd, head of the fuels department of General Motors research laboratories and ASTM executive secretary C. L. Larwick will speak.

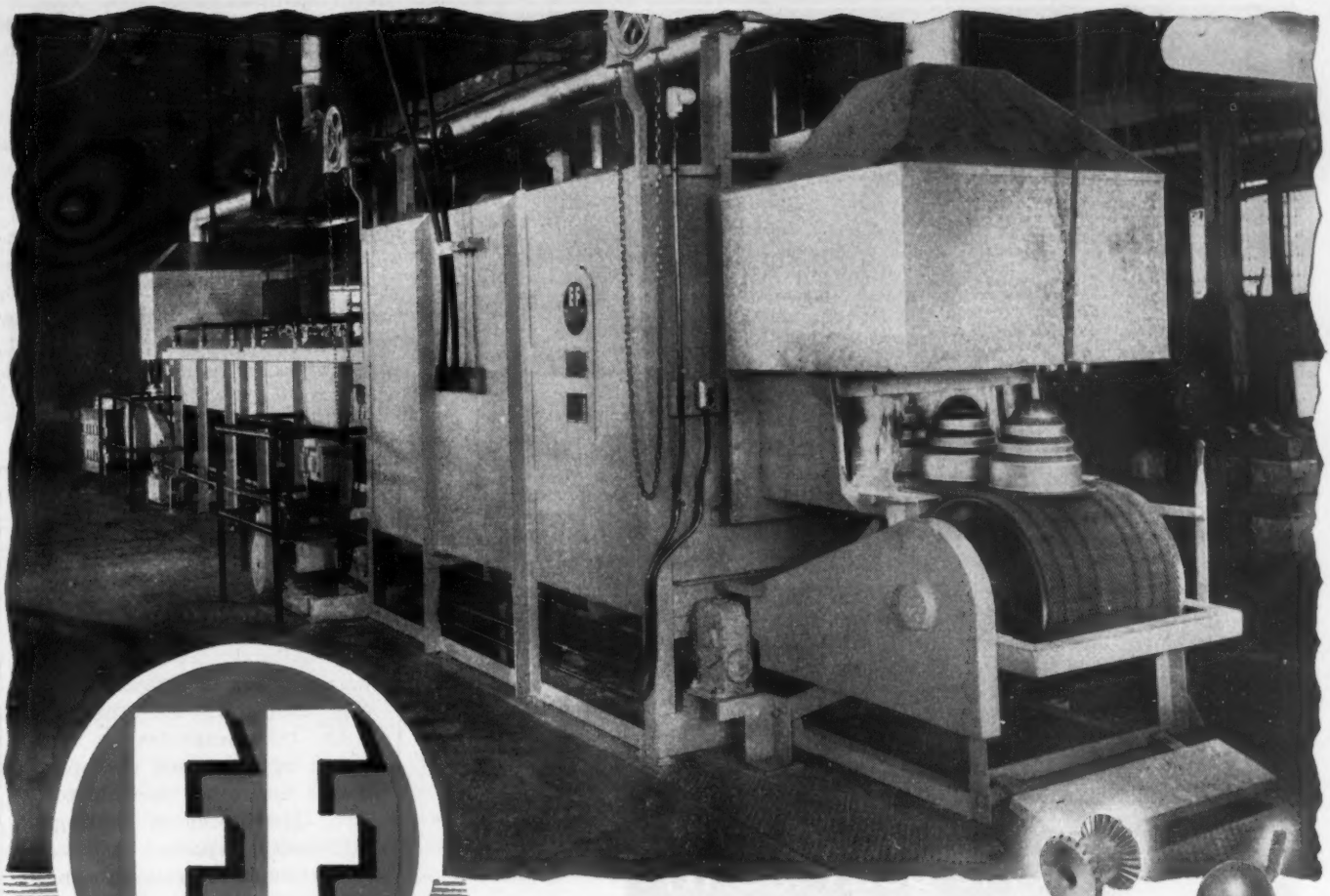
Engineering Societies' Building, New York, will be the scene of the New York district meeting scheduled for 7:30 p.m., October 30. Kingsley W. Given, in charge of the lecture bureau of the chemical department, General Electric Co., Pittsfield, Mass., will give a demonstration and speak on silicones. He will describe special types of lacquers, lubricants, "bouncing putty", etc.

Resharpened Many Times

Ingersoll-Rand Co., Phillipsburg, N. J., is manufacturing a new stud-type Jackbit with an attachment member designated as the Jackstud, designed for rock drilling. Bit has carefully worked out wing curves which enable it to retain new bit proportions through many resharpenings. Resulting small gage loss permits using successive bits with reductions in diameter of 1/16-in. or less per change.

Marks Gears and Bushings

Using a combination of a solid stamp and interchangeable type, a new stamping device for annular marking, developed by New Method Steel Stamps Inc., 147 Jos. Campau, Detroit 7, will mark parts like gears, bushings and sleeves with standard information as well as with variable data. It consists of mounting adaptor, bushing stamp for standard in-



EF BRAZING FURNACES

for any size, shape, weight and quantity requirement

● EF Brazing Furnaces reflect in every detail the advantage of our long and successful experience with the requirements of practical every day operation. They are available in different designs, and different sizes, and with special atmospheres as needed, for brazing ferrous, non-ferrous and bi-metallic assemblies.

The EF heavy cast alloy electric heating elements, and other exclusive features of EF design, assure exceedingly accurate control of furnace temperatures within the desired range and uniform distribution of heat throughout the furnace, producing uniformly strong joints and high surface finish.

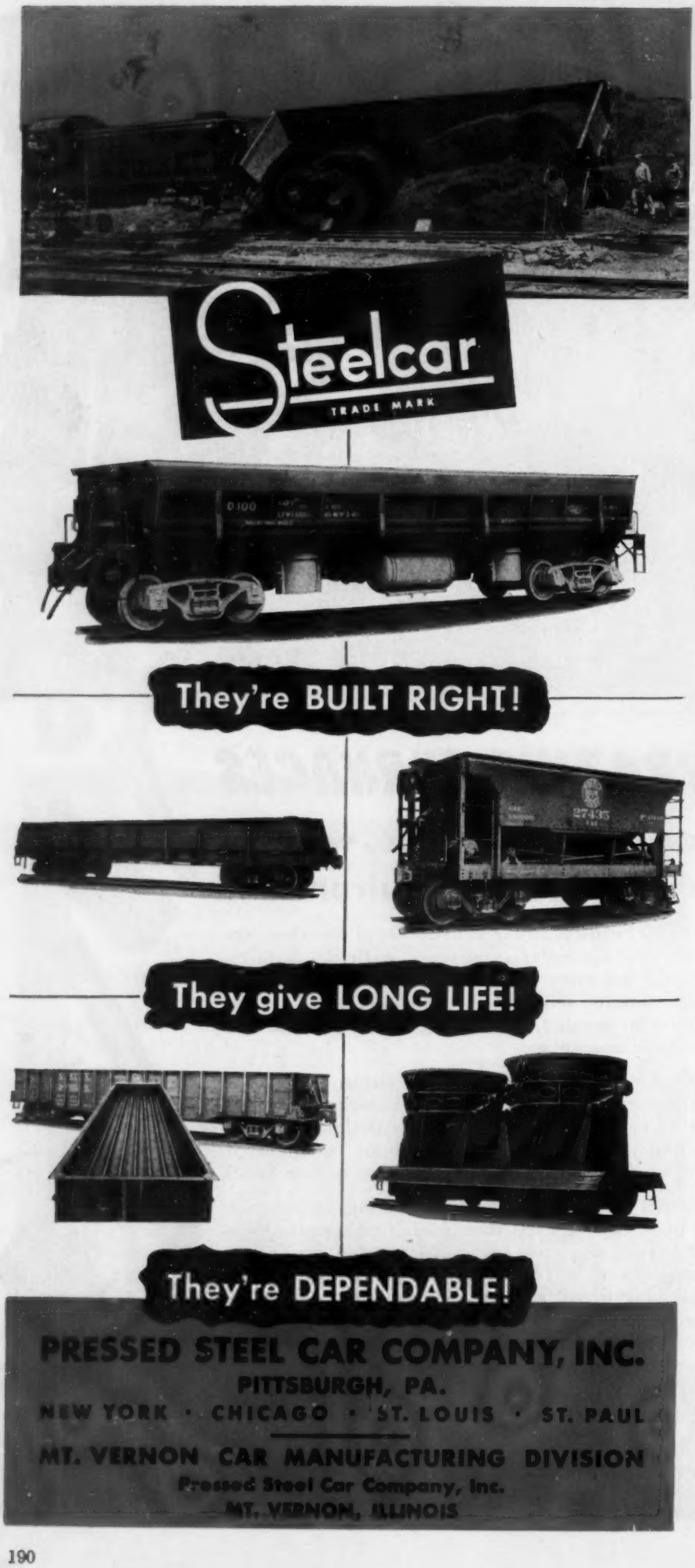
To gain the fullest advantage of the savings in material, assembly and finishing costs that brazing makes possible,—let the EF brazing engineers analyze your design, suggest the brazing temperature, brazing medium and brazing atmosphere best suited to your particular requirement,—and even show you what the final result of EF brazing will be, by running samples of your product through our test brazing furnaces.

THE ELECTRIC FURNACE CO.

WILSON ST. AT PENNA. R.R.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem-Ohio



formation and mortised to take interchangeable characters—all held together by set screws.

Begins Production of 20-Ton Diesel Tractor

Increased capacity and performance, dependability and improved operator comfort are features of the 20-ton HD-19 diesel crawler tractor, now in production at the Springfield, Ill., works of Allis-Chalmers Mfg. Co. Reported to be the world's largest of its type, the tractor's capacity for doing more work is increased by means of a three stage hydraulic torque converter introduced into the power train of the tractor. Application of the liquid drive principle to crawler type tractors is said to permit horepower output of the engine to be held constantly near the maximum.

RESEARCH "BLITZED"

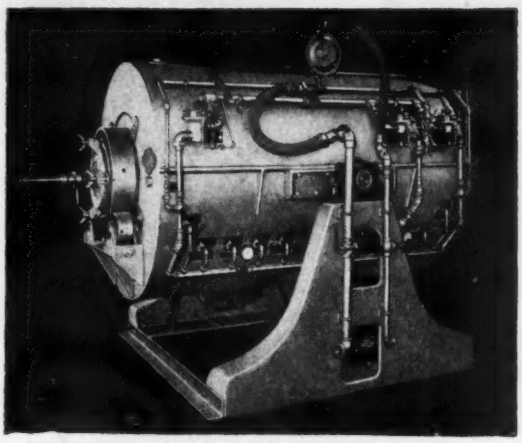
During the war, intensive metallurgical research was carried out in Germany, but since 1945 it has almost ceased due to material destruction and damage, loss of equipment and the dismissal, in connection with the denazification program, of the heads of departments and other investigators, Prof. M. Hansen of Gottingen University, reports. A severe limitation in the country's metallurgical research in the future is unavoidable. Whereas formerly costs were largely borne by industry, research in the future will probably have to be financed by the state. They will have to be engaged mainly on problems of fundamental research, and training of the younger generaiton, he said.

Press Accessories Offered

Adjustable ram and adjustable platen are announced as accessories for air-hydraulic presses made by Air-Hydraulics Inc., 401 Broadway, New York 13. Length of ram may be changed without affecting length of stroke which may be set to come down to any point within the 2 in. range of adjustment. Overall length is 5 in. Platen furnishes a quick method of raising and lowering table platen, simplifying and speeding up

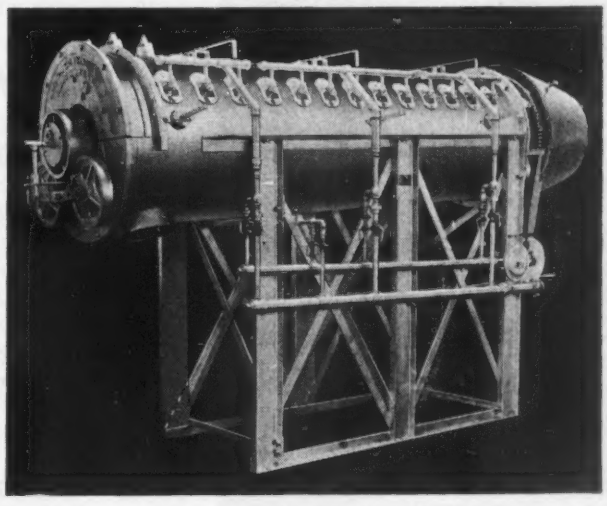
Pioneers IN HEAT TREATING EQUIPMENT SINCE 1878

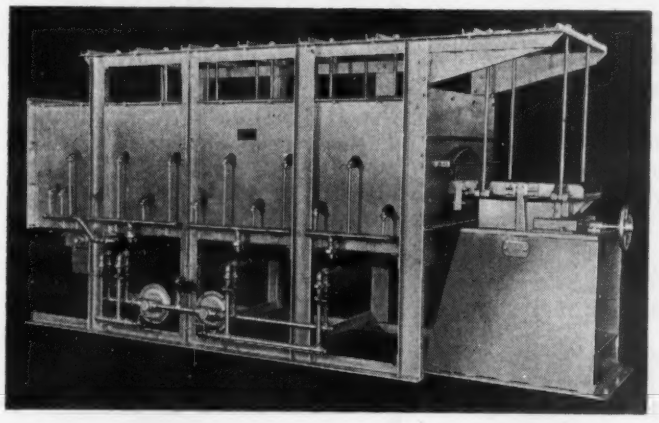
VERSATILE EQUIPMENT WHICH CAN BE USED WITHOUT MODIFICATION FOR CLEAN HARDENING, NORMALIZING, CARBURIZING, CASE HARDENING BY THE PATENTED "NI-CARB" PROCESS, AND OTHER TYPES OF GENERAL AND ATMOSPHERE WORK.



ROTARY GAS CARBURIZERS. Work uniformity is assured by gentle mixing of work produced by rotary action of retort, which is heated by numerous carefully distributed and balanced burners. Carburizing or atmosphere gas is introduced through a simply-designed, trouble-free connection. Charging and discharging of the work is accomplished by means of a tilting feature, which is power driven on the larger model. The retort remains within the heat at all times. Maintenance and handling of carburizing boxes are completely eliminated. Our No. 4 Rotary Gas Carburizer, illustrated at the left, has an operating capacity (2/3 full) of about 18,500 cubic inches—one of four standard sizes.

ROTARY CONTINUOUS FURNACES. Work heat treated in these furnaces ranges from small pins and bearing parts up to heavy forgings for universal joints, which are normalized in the larger rotaries. These furnaces also find application in the process industries for calcining carbonates and nitrates, burning garnet grain, and similar processes. Uniform heating is assured by the gentle mixing of the work as it passes through the rotating retort. Speed of rotation is controlled by a variable speed transmission, permitting quick and exact adjustment of the time-temperature cycle. Atmosphere control is complete and positive, assuring uniform, easily duplicated results at all times. The atmosphere gas is introduced through a simply-designed, trouble-free connection. Long retort life is assured by the fact that it remains within the heat at all times. Only work enters and leaves the furnace. Economical operation is secured by the thick lining of insulating refractory, backed by block insulation. Firing by means of many small burners keeps fuel efficiency high, heat losses low. The furnace illustrated at the right is our No. 139-M Rotary Furnace, which has a capacity of 500 to 1000 lbs. per hour depending upon the work—one of five standard sizes.





RECIPROCATING, ATMOSPHERIC CONTROLLED FURNACES. Among users of this type furnace are manufacturers of bearings, screws, lock washers, tools, wrenches, flat and coil springs, steel writing pens, and many others. Commercial heat treaters favor Reciprocating Furnaces because they are able to handle the many varied and different jobs daily received in a general heat-treating shop. The reciprocating muffle advances the work through the heat by its own momentum. The complete elimination of conveying mechanism from the heating chamber reduces maintenance problems and heat losses to a minimum. There is no traveling belt to be alternately heated and cooled—only work enters and leaves the furnace. The furnace illustrated at the left is our No. 191-B Reciprocating Furnace, having a capacity of 300 to 600 lbs. of work per hour—one of five standard sizes.

Write for detailed literature on these furnaces and other types of heat treating equipment or visit our exhibit at the Metal Show, American Gas Association Section.

AMERICAN GAS FURNACE CO.,
1006 LAFAYETTE STREET, ELIZABETH B, N. J.

tooling. It may be rotated without changing tooling height and may be raised or lowered as little as 0.001-in.

OTS Report Describes Aluminum Alloy Production

Production of aluminum-silicon alloys at the Lurgi-Thermie plant, in Herrem, Germany, involves briquetting a mixture of powdered alumina, crushed kaolin, oil, coal and charcoal, according to a British report, No. PB-28954, available from Office of Technical Services, Department of Commerce, Washington.

The briquettes, egg-shaped, 3 inches long and weighing about 80 grams, are stored for about 8 days for thorough drying. They are smelted with silica in furnaces to produce an aluminum-silicon alloy containing 40-60 per cent silicon. This alloy is then refined in an electric arc refining furnace and finally alloyed with aluminum metal in a gas fired melting furnace to produce silumin containing 12 per cent silicon, the report states.

Silver Brazing Alloy

Lower silver content, lower operating temperature and fast spreading ability are characteristics of Easy-Flo 45 silver brazing alloy marketed by Handy & Harman, 82 Fulton street, New York 7. Its working temperature is 1145° F. Silver content gives the alloy strength and ductility and provides good fluidity and ability to penetrate rapidly between closely fitted parts.

Efficient Cooler

With a press-formed rust proof cabinet, quick change filter pad louvers, water regulating switch and valve, clog proof adjustable trough drip system and a rust proof regulating water meter, the model S 3000 Sno Breze evaporative cooler made by Palmer Mfg. Co., Phoenix, Ariz., delivers approximately 3000 cfm. It is powered by a deep pitch, slow speed fan. Overall size is 32 x 28 x 28.

Offers Replacement Wheels

Balanced, smooth running ball bearing wheels which may be used for conveyor replacements and other uses are manufactured by George K. Garrett Co., 1421 Chestnut street, Philadelphia 2. Wheels are 2 in. diameter and contain seven ¼-in. balls. Made to fit standard axles with ¼-

INCREASED CUTTER LIFE 3 to 4 times with SOLVOL*

... reports
E. J. GRAHAM, SR.
D. A. Stuart Oil Co.
Representative

"Stuart's SOLVOL* was put in on a trial basis for use in Cincinnati Milling Machines on high carbon alloy steel. High speed alloy cutters were used and it was found that SOLVOL* increased the cutter life three to four times of what they had been getting.

"This customer is well pleased with SOLVOL* and will continue to use it in the future on these machines."

Signed E. J. Graham

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The SUPER Soluble Liquid Cutting Compound

When conventional soluble products fall just short of giving the desired results, and yet conditions of the job seem to call for an emulsion, then the use of Solvol, Stuart's *super* soluble, is indicated. Solvol is more than just a high grade emulsifiable cutting fluid. It is a unique product incorporating extra lubricating qualities which enable it to perform metal cutting jobs beyond the scope of other soluble products. It is a stable, homogeneous compound which mixes readily with water to form an emulsion rich in cutting quality. ¶ The performance report above is typical, you can't beat the right Stuart oil correctly applied to the job. Let a trained Stuart representative help you to improve production and quality. SOLVOL literature on request.

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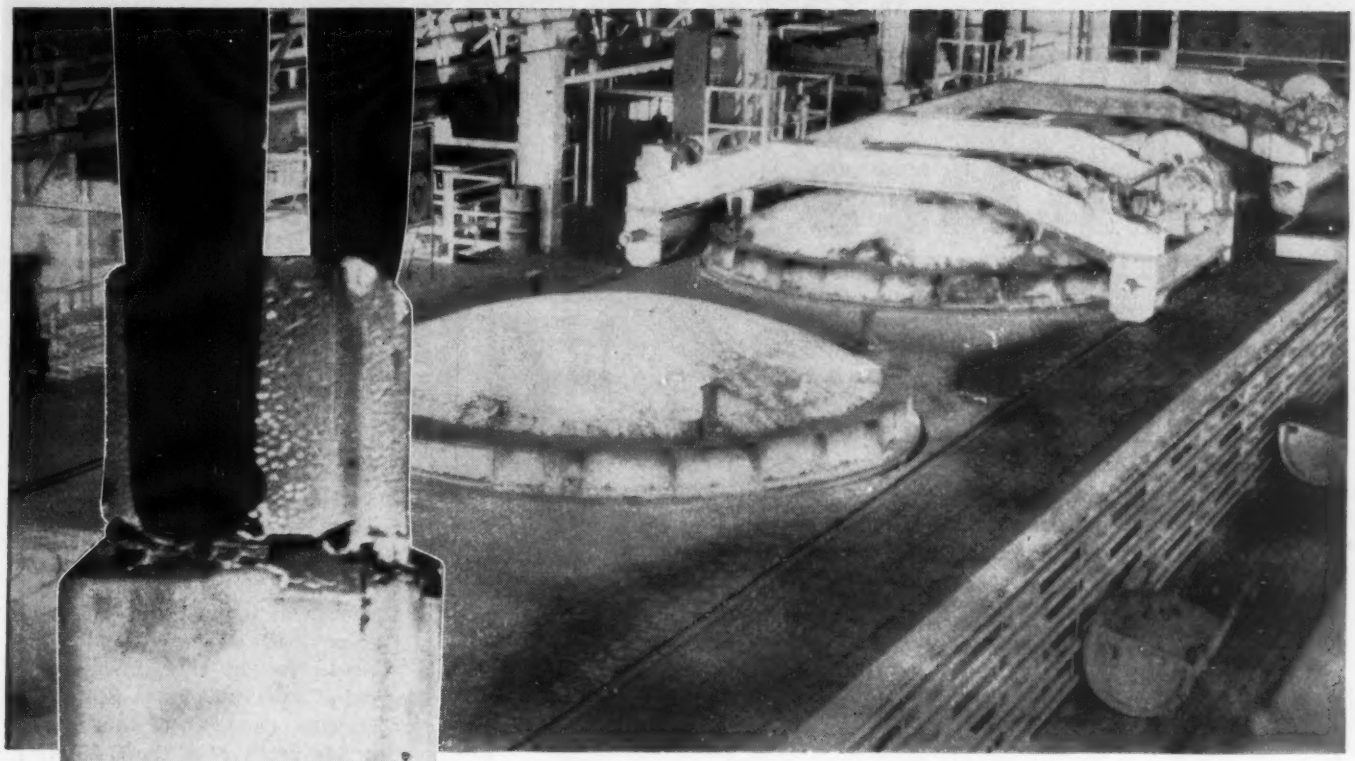

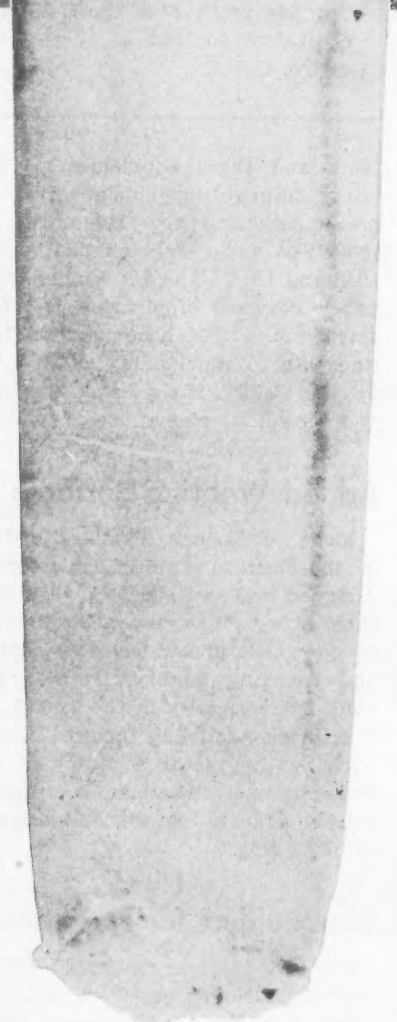

Here's an absolutely unretouched photo—observe the results.

THE SALEM CIRCULAR SOAKING PIT

The circular shape of the pit makes charging and ingot positioning a very simple process. It also makes possible easy identification of the various ingots of a given heat within the pit. High tonnages under cover can be obtained over a wide range of ingot sizes and shapes without encroachment on combustion space. Regardless of the number of ingots placed in a pit, all ingots are located at a uniform distance from the source of heat.

From this standpoint alone, it is apparent why "The Salem Circular Pit" delivers the most uniformly heated ingots.

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MECHANICAL EQUIPMENT FOR CHARGING AND DISCHARGING MATERIAL FROM FURNACES

ROUSTABOUT CRANES

. . . offer you safety, speed and low costs not possible with out-of-date man-handling methods

● Avoid strains and injuries and the dangers and high costs of a cluttered disorganized yard by modernizing your outdoor materials handling with these rugged mobile Roustabouts. Flexible performance—fast action with hook or magnet, loads to 7½ tons—built for years of overwork, as hundreds of users can tell you. Write for the money-saving facts . . . *today!*

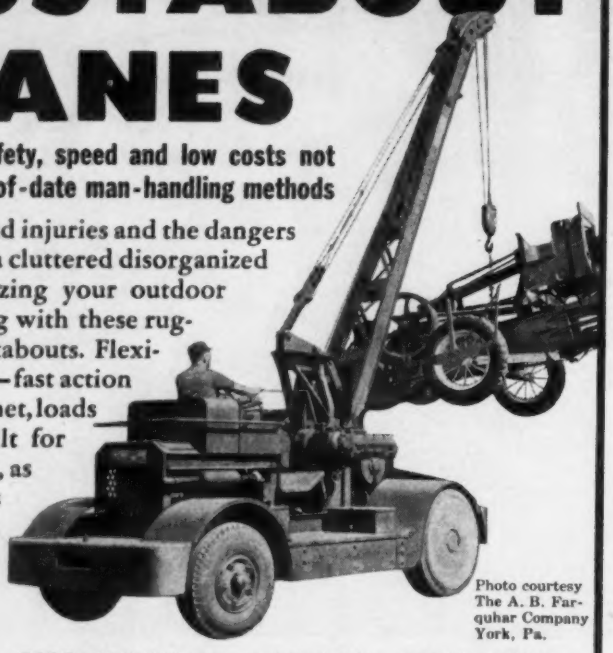

Photo courtesy The A. B. Farquhar Company York, Pa.

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ROUSTABOUT CRANE

Roustabout Cranes
By Hughes-Keenan

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Any Metal · Any Perforation

INDUSTRIAL and ORNAMENTAL

The Harrington & King PERFORATING Co.

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in. bolts, the wheels are plated for long lasting qualities.

Electrical Contacts Bibliography Published

Through the work of its committee B-4 on electrical heating, resistance and related alloys, the American Socieyt for Tecting Materials has issued a bibliography on electrical contacts and three supplements. The latest 26-page supplement gives replacements and new references for 1940-1944 and covers publications in 1945 and 1946. The 6 x 9 inch, heavy paper covered supplement is available from ASTM headquarters, 1916 Race St., Philadelphia, as are the original bibliography and the first and second supplements.

FAST "WORK HORSE"

Latest "work horse" added to the Army's Air Transport Command is a giant cargo plane, the Boeing C-97 Stratofreighter, largest flying freight car thus far in operation. It has the payload of two standard railroad freight cars, plus the speed of a pursuit plane. Stated otherwise, capacity of this 62-ton "big brother" of the B-29 is equivalent to that of 17 C-47s or five C-54s.

Added Wearing Surfaces

Made in ⅞-inch diameter instead of the former 11/16-in., microgages designed by Van Keuren Co., 176 Waltham street, Watertown, Mass., have 60 per cent more wearing surface and wringing quality. It also provides extra rigidity in the 2, 3, 4 and 6 in. blocks, enabling them to be produced with greater accuracy of size and squareness. Microgages are available in 5-block, 7-block, 16-block and 35-block sets.

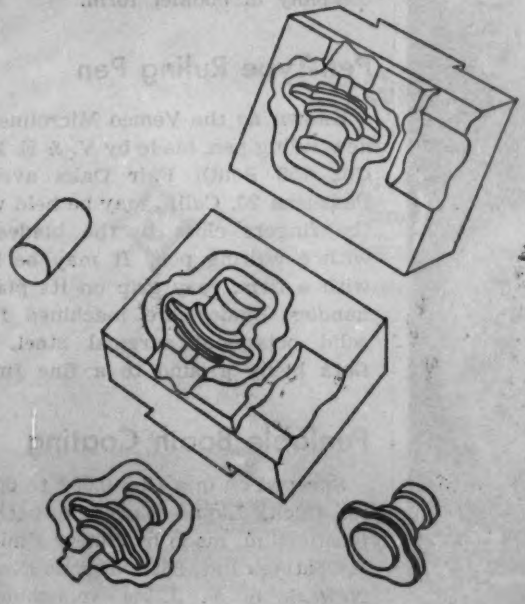
Lampholders for Fluorescents

General Electric Co., 1285 Boston avenue, Bridgeport 2, Conn., announces two new fluorescent lampholders, one for 8¼-in. Circline lamps, the other for standard lamps. Circline holder, designed for use in portable lamps, consists of a white enameled channel with white plastic lampholder at one end and a white plastic tension support at the other.

Want Tighter Control Over Parts Cost?...

A BULLETIN SERVICE

for users of forgings, entitled "Advantages Obtained by Utilizing Champion Forging Techniques", gives complete information about cost reductions and quality control achieved by forging specific parts in closed impression dies.



...Investigate Forgings...

Close Tolerance Forgings Produced by

Champion FORGING TECHNIQUES

● Begin by taking specific parts—cast parts, stamped parts, machined-from-bar-stock parts, forged parts. Analyze them with the aid of a Champion Forging Techniques Engineer who, because of many years of forging production experience, may help you to discover opportunities, heretofore unappreciated or overlooked, to obtain and maintain tighter control over end-use cost. In some cases, tighter control may involve conversion from another method of fabrication to forging the part. When such an opportunity is revealed, tighter control usually begins at the drafting board stage. In other cases, tighter control over parts cost may begin at the buying stage, or at the machining and finishing stage. A Champion Forging Techniques Engineer frequently identifies, through analysis of the design of a part and the method of fabricating it, cost reductions of major importance. Ask him for suggestions on how to exercise tighter control over parts cost.

THE CHAMPION MACHINE & FORGING COMPANY

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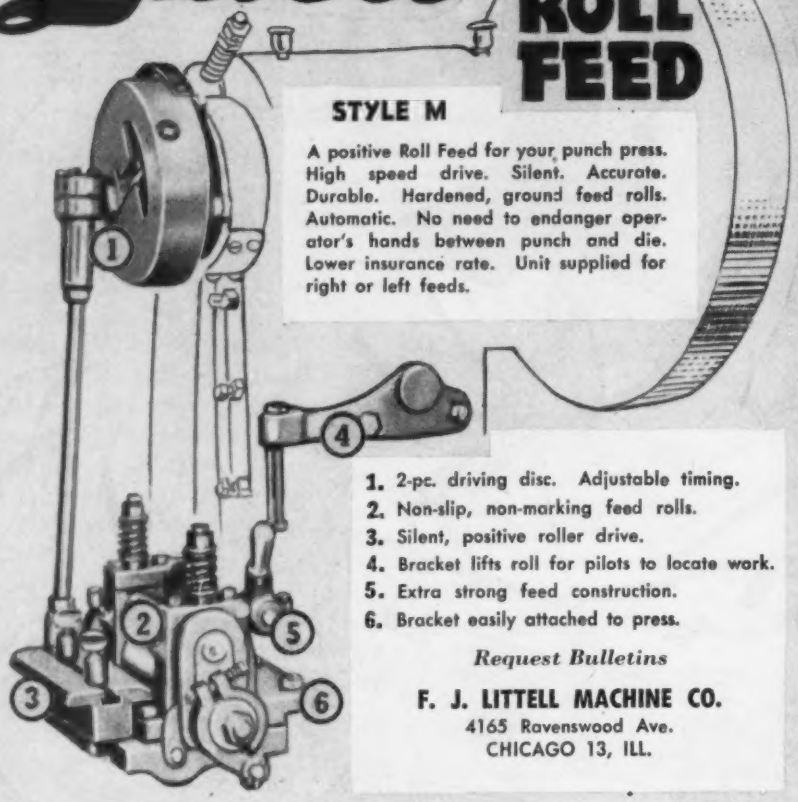
DROP AND UPSET FORGINGS, CARBON AND ALLOY STEELS • HEAT TREATING • LABORATORY AND QUALITY CONTROL

Littell ROLL FEED



STYLE M

A positive Roll Feed for your punch press. High speed drive. Silent. Accurate. Durable. Hardened, ground feed rolls. Automatic. No need to endanger operator's hands between punch and die. Lower insurance rate. Unit supplied for right or left feeds.

1. 2-pc. driving disc. Adjustable timing.
2. Non-slip, non-marking feed rolls.
3. Silent, positive roller drive.
4. Bracket lifts roll for pilots to locate work.
5. Extra strong feed construction.
6. Bracket easily attached to press.

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4165 Ravenswood Ave.
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60 YEARS OF SERVICE to INDUSTRY

SUPPLYING

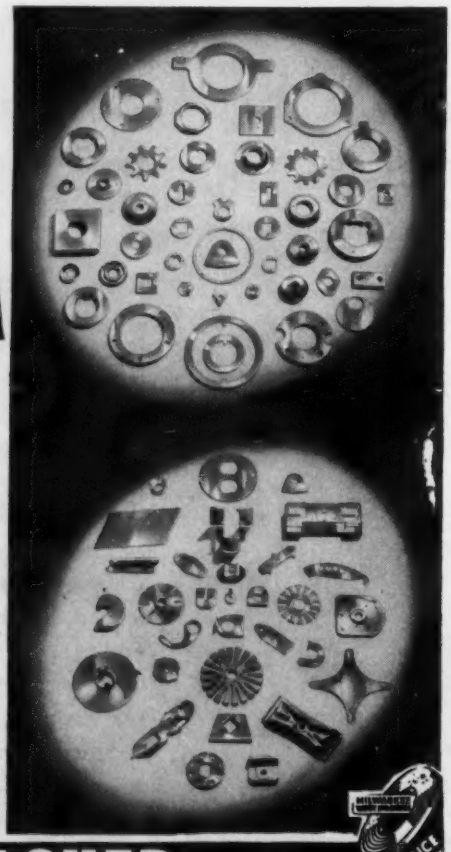
WASHERS

and

STAMPINGS

OF EVERY DESCRIPTION FOR EVERY PURPOSE... UTILIZING MORE THAN 22,000 SETS OF DIES

Let Us Quote On Your Needs!



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Available with lamp switch and two 30-in. lead wires or without switch and with four 30-in. leads. Standard holder is a high luster white plastic.

Temper Designations for Aluminum Published

Rapid metallurgical advances and improved fabricating techniques during the past few years have served to present temper designation system for aluminum and aluminum alloys.

One example of how the present system is unable to fulfill present requirements is found in alloy 24S, widely used wartime aircraft material. Government specifications recognize the fact that 24S-T flat sheet has higher properties than may result from heat treating a formed 24-T part. Under the present system, however, designers have no way of distinguishing on the drawing boards what kind of 24S-T they mean. Other examples requiring need for better temper designation system are found in the other forms in which aluminum is fabricated, including extrusions, tubing, wire, rod and bar, forgings, rivets and castings.

In order to overcome such inadequacies in the present system and also to provide a definite pattern for future developments, a revised system of aluminum alloy temper designations has been developed by Aluminum Co. of America, Pittsburgh. This new system, based on manufacturing techniques, becomes effective on all company's product shipments made on and after Jan. 1, 1948. Presentation of these new temper designations is available from the company in booklet form.

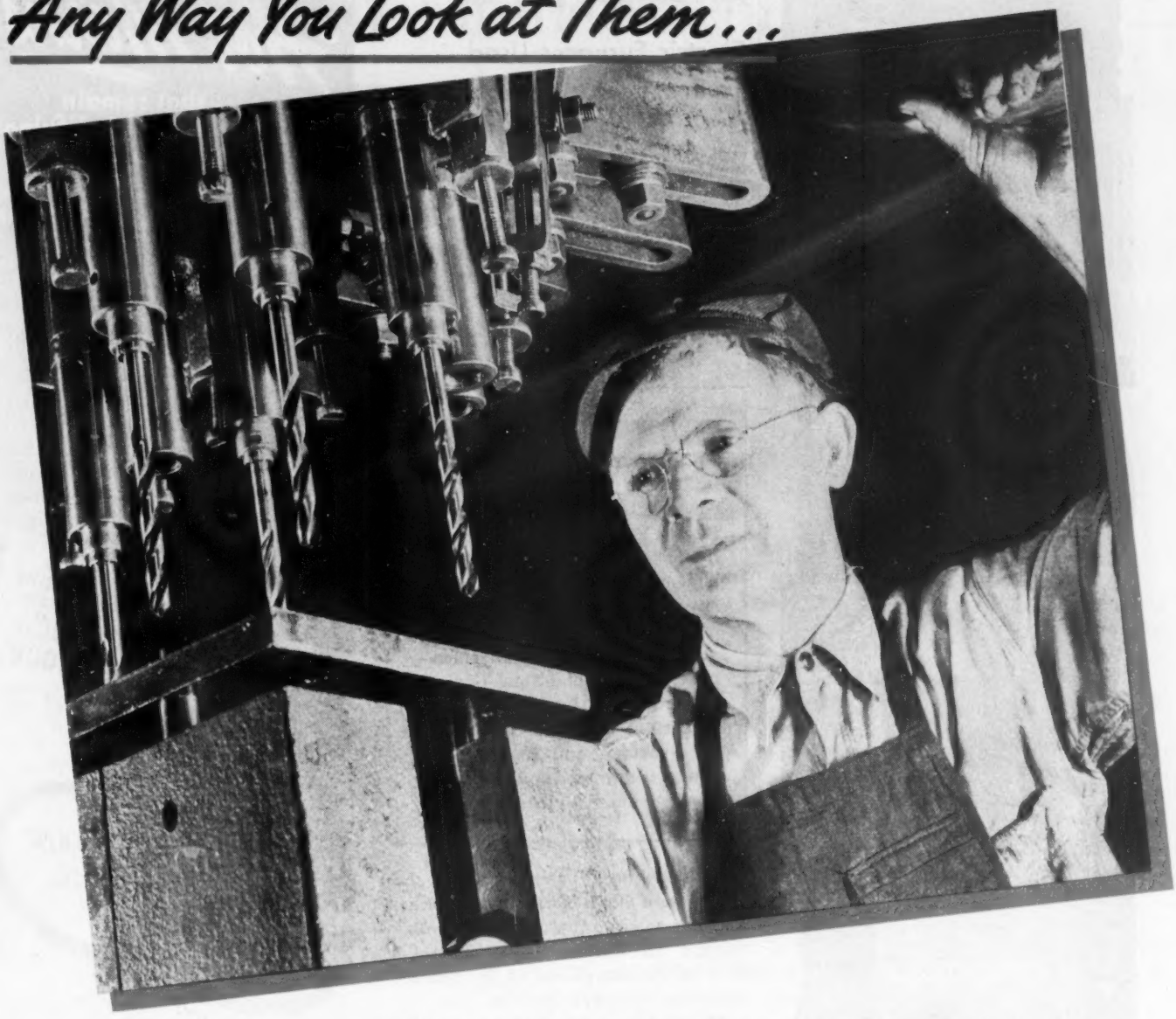
Pen-Type Ruling Pen

Known as the Vemco Microliner, a new ruling pen, made by V. & E. Mfg. Co., 758 South Fair Oaks avenue, Pasadena 20, Calif., may be held with the fingers close to the blades as with a writing pen. It may be held with a firm, easy grip on its plastic handle. Blades are machined from solid octagonal surgical steel, the flats being ground to a fine finish.

Peelable Booth Coating

Sprayed on in a film 0.002 to 0.005-in. thick, Liquid Envelope peelable plastic film, made by Better Finishes & Coatings Inc., 268 Doremus avenue, Newark 5, N. J., is applicable to paint spray booths. When booth is ready for cleaning, coating is peeled off down to the metal in large sheets.

Any Way You Look at Them...



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TRADE MARK REG. U.S. PAT. OFF.

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Hundreds of tests have proven that CLE-FORGE High Speed Drills produce holes *faster* and *at lower cost.* This is the basis on which drills should be selected, for the original cost of a drill does not determine its value. You will find that CLE-FORGE High Speed Drills give you more holes per dollar... and thus actually cost less.

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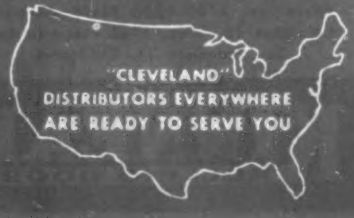

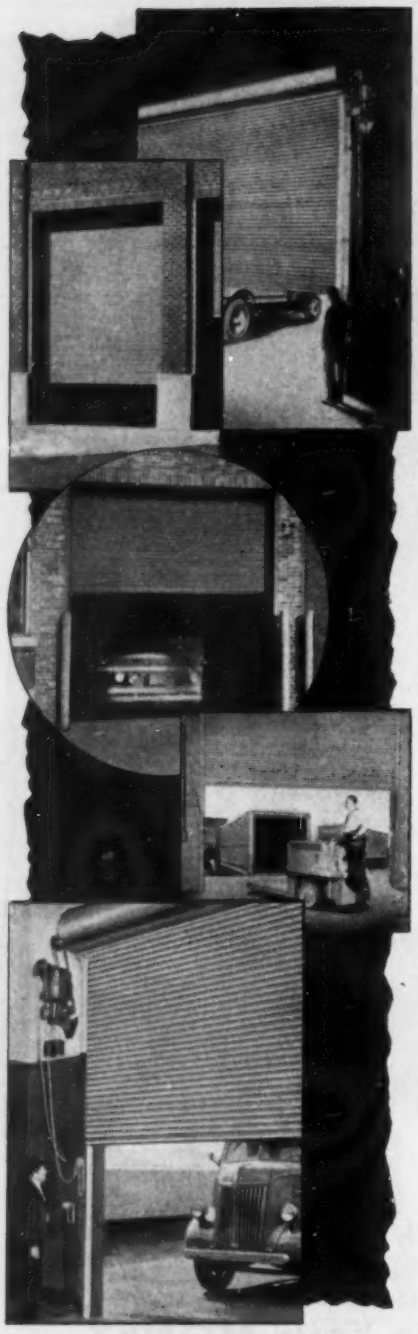

IN EVERY CASE...

Kinnear Rolling Doors offer peak efficiency at lower cost, for a longer time. Their smooth, easy operation . . . the space-economy of their coiling upward action . . . the extra protection of their all-metal construction . . . the windproof safety of their compact, overhead storage — and many other features are preferred by builders, architects, and building owners. Any size, for old or new construction. Motor operation available, with remote controls if desired.

THE KINNEAR MFG. CO.

Factories: 1780-1800 Fields Avenue, Columbus 16, Ohio; 1742 Yosemite Ave., San Francisco 24, California.

KINNEAR ROLLING DOORS

carrying with it all accumulated paint, lacquer and spray dust.

Electric Furnaces Used To Braze Evaporators

One operator at each of two 320 kilowatt roller hearth electric brazing furnaces easily handles the conversion of stamped, sheet steel plates into brazed sections, later to become refrigerator evaporators in the North Chicago Division plant of Houdaille-Hershey Corp.

Brazing begins after the operator has placed a copper strip between two steel stampings, has loaded the material on a heat resisting alloy rack and has pushed the rack over rollers toward an automatically controlled door on the charge end of the furnace, made by General Electric Co.

The heating chamber, reached through a 35-inch wide door which opens vertically 13 inches, extends 17 feet, brazing the pieces together at 2050° F. Rollers convey the racks through a 70-foot cooling chamber after leaving the furnace chamber, automatic discharge door opening to permit egress of the racks onto a conveying system designed by Houdaille-Hershey for use with the furnaces.

Racks are then conveyed back to the charge end of the furnace where they are unloaded by the operator. Subsequent operations see the parts baked, chemically treated, soldered and formed into the final evaporators.

IMPROVED TOWER DESIGN

Dead air spaces are eliminated in a newly developed cooling tower being built by Santa Fe Tank & Tower Co., Los Angeles. Cylindrical design of the vessel allows air to enter the tower from any point of its entire circumference, instead of from only two sides—or two sides and four corners. According to the company, construction does not require use of diverters, and shape of the tower allows loads imposed by wind pressure to be reduced.

Reusable Gauntlet-Cuff

C. Walker Jones, Philadelphia 38, has developed a safety gauntlet-cuff which is a separate piece with extra strong covering for the forearm. When gloves become worn, they may be replaced, retaining the gauntlet-cuff,

Hot Marks
... that remain clear and identifying when cold !
FOR MARKING METALS TO 800°
METAL MARK
HOTMARX
FOR MARKING METALS 800° TO 2000°
THE PERFECT PAIR FOR ALL METAL MARKING

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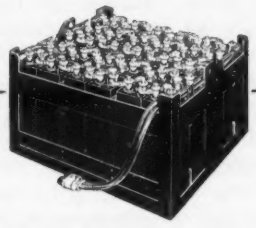
POWER FOR TRUCKS THAT MUST WORK—

24 hours a day... EVERY DAY!



In Industrial Trucks,* EDISON *Nickel-Iron-Alkaline Batteries Give You These Important Advantages

They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

They can be **charged rapidly;** gassing cannot dislodge the active materials.

They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.

They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place.

They are **simple and easy to maintain.**

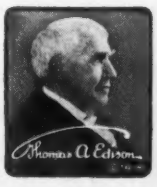
Illustrated above is a material-handling job for which trucks must be kept on duty 24 hours a day, every working day. It is the kind of job in which battery industrial trucks excel because of their dependability and economy.

With batteries exchanged two or three times a day, the truck is kept continuously supplied with power. While one battery is being charged, another operates the truck.

IDEAL POWER CHARACTERISTICS

The truck starts instantly, accelerates smoothly; operates quietly; gives off no fumes; consumes no power during stops. Thus, it makes efficient use of power, and the current used for charging its batteries is the lowest-cost power available. Its electric-motor drives have a minimum of wearing parts and are inherently simple and trouble-free.

A battery industrial truck is most dependable and most economical when powered by EDISON Nickel-Iron-Alkaline Batteries. With steel cell construction, a solution that is a natural preservative of steel, and a fool-proof principle of operation, they are the most durable, longest lived, and most trouble-free of all types of batteries. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey. In Canada: International Equipment Company, Montreal and Toronto.*



EDISON

Nickel • Iron • Alkaline

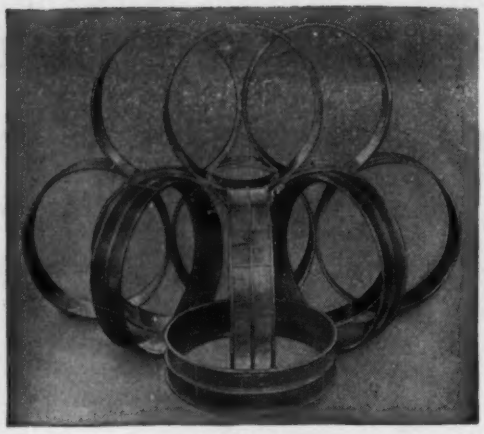
STORAGE BATTERIES

Typical

of

HENDRICK

WORKMANSHIP



These milled-slot screens, for centrifugal drying of various materials, are made of 1/8" stainless steel, and in their fabrication tolerances as close as plus or minus .0001" were maintained; an illustration of Hendrick's expert workmanship.

Hendrick offers unusual facilities for the manufacturing of many specialized products, of which these screens are a typical example.

SEE OUR CATALOG IN SWEET'S

HENDRICK

Manufacturing Company

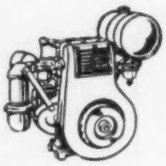
30 DUNDAFF STREET, CARBONDALE, PENNA.

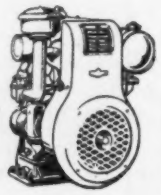
Sales Offices In Principal Cities

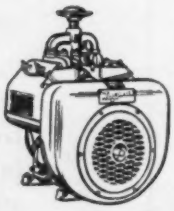
Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

The

REAL MEASURE of ENGINE VALUE is "H. P. HOURS" of POWER SERVICE







It isn't the original H.P. rating of an engine that counts but rather, the number of *H.P. Hours* of power service it will deliver during its lifetime. This, in the final analysis, is the real measure of *engine value.*

Wisconsin Air-Cooled Engines deliver the most H.P. Hours because they are designed and built for rugged, heavy-duty service. For example: every Wisconsin Engine, from the smallest to the largest, runs on Timken tapered roller bearings at both ends of the crankshaft to take up end-thrust and provide the best protection against bearing failure . . . at the same time assuring a smooth-running engine. This is just one typical detail that stands back of "Most H.P. Hours" of on-the-job power service.

You can't go wrong if you specify "Wisconsin Air-Cooled Engines" to meet your power requirements, within a 2 to 30 hp. power range.

Wisconsin Engines are available in a complete range of types and sizes (all 4-cycle) from 2 to 30 hp.

WISCONSIN MOTOR Corporation

MILWAUKEE 14, WISCONSIN

World's Largest Builders of Heavy Duty Air-Cooled Engines

which fits snugly at the wrist around the new glove.

Corrosion Congress Hears Paper on Precious Metals

Ability to withstand environments which would destroy other materials, illustrated by use of platinum in handling glass in the fiber glass industry which was made possible by resistance of platinum to molten glass, is an example of the industrial uses of precious metals according to a paper by Edmund M. Wise of International Nickel Co. Inc., New York, presented this week before the International Congress of Corrosion, Paris, France.

In the paper, read by Dr. Maurice Ballay, director of research of the Centre d'Information du Nickel, Paris, the author dealt primarily with the industrial uses of the eight precious metals—the six platinum metals in particular. He pointed out industrial applications of these metals and properties which are responsible for their use.

In their use as catalysts, the author shows that precious metals have higher conversion efficiency and the ability to function at lower temperatures and pressures. Outside the chemical field, the good behavior of the precious metals as electrical contacts is described as being due to resistance to oxidation and, except for silver, to sulphidation. An illustration of this is the use of palladium contacts in telephone relays in all voice current circuits, contributing to the low noise level and reliability of telephone circuits in the United States.

To Classify More Than 11,000 Welding Patents

Classification system for the more than 11,000 welding patents now in the Davis Welding Library at Ohio State University is being established, according to Dean Charles E. MacQuigg of the College of Engineering.

In charge of the project, which will enable industries, students and research workers to obtain more readily information on all patents granted in their specific lines, is Dr. W. H. Simon of the University of Toronto.

Cost of the work is being absorbed by the A. F. Davis Welding Engineering Scholarship and Library Fund. Mr. Davis, vice president, Lincoln Electric Co., Cleveland, and an alumnus of Ohio State, established the welding library a number of years ago and at the same time set up such a scholarship fund.

Library includes a large collection of patents relating to the welding

NEW

20 KW

High Frequency Converter

20-kw converter with 17-lb. furnace

IT'S AS EASY TO OPERATE AS A KITCHEN STOVE

To operate this all-purpose high frequency converter for any high-speed induction melting, brazing, soldering, hardening or similar job, you simply connect the furnace, flip a switch, and adjust a knob to govern the speed of heating.

A modern version of the Ajax-Northrup unit that has proven its economy and low maintenance over 25 years of hard use, this new converter is completely enclosed, measures only 44x44x58", can be spotted right in your production line.

SELF TUNING: No gap or coil adjustments to be made because the electrical circuit is self tuning. Frequencies range from 20,000 to 80,000 cycles depending on size and shape of furnace coil. Heating coils are easily interchanged.

Capable of sustained operation at 20 kw. input, spark-gap electrodes have long, trouble-free life. Gap and coils are protected by safety devices in case of hydrogen or water failure. New Bulletin 14-A gives you the whole story—send for it now.

SEE AJAX AT METAL SHOW BOOTH 1151

APPLICATIONS

MELTING—Laboratory and small-production to 30 lbs. steel —60 lbs. brass.

FORGING—Parts from ¼ to 1½ in. dia.

HARDENING—Through and surface hardening of parts to 1½" diameter.

BRAZING—Small and medium sized parts where heat must be localized.

MISCELLANEOUS—High temperatures, sintering carbides, drying coatings, heating in a vacuum, vaporization.

AJAX ELECTROTHERMIC CORPORATION, Trenton, N. J.:

I am interested in above applications. Please send me a copy of new bulletin 14-A.

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AJAX METAL COMPANY • AJAX ELECTRIC CO., INC.

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HIGH-FREQUENCY HEATING-MELTING

Usually it's easier, faster, and cheaper to cast metal in the contour of a die than to machine the die out of a solid block.

As for the final result, experience has proved that dies cast of *STRENES METAL* deliver an extraordinary number of stampings between redressings. The principal reason is that the *STRENES METAL* formula is adapted to the specific job which the die is intended to perform.

We'll be glad to tell you all about *STRENES METAL* cast dies, including actual cases. Write, wire, or phone us.

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Strenes Metal DRAWING AND FORMING DIES

This is how STROM BALLS are born

A heading machine cutting sections from heated steel rods and compressing them in a die to a rough spherical shape.

The steel is carefully chosen and inspected, even before it gets to the heading machine. After being "born" here, balls are carefully "brought up," through a long series of grinding and lapping operations, to the unbelievably high standards of finish, sphericity and precision which have made Strom Metal Balls the standard of Industry. Strom Steel Ball Co., 1850 South 54th Avenue, Cicero 50, Illinois.

Strom BALLS Serve Industry

Largest Independent and Exclusive Metal Ball Manufacturer

processes and their industrial applications. At present the patents are grouped according to the classes and sub-classes of the U. S. Patent Office, set up years ago when welding was in its infancy.

Hone Uses Electronics For Automatic Sizing

Industrial trend toward the increased use of electronics for improved performance is joined by Micromatic Hone Corp., Detroit, which now uses electronic tubes as the control, or brain, of the automatic Microsize device developed by the company. When the bore being machined is honed "to size," this sizing device takes over the control of the machine and directs it through the proper sequence of operations to end the cycle.

Electronic tubes provide what the company thinks is the criterion of a good automatic sizing machine—consistent performance. Each operation should be rapid and positive, without variation, under high production conditions. This is possible with electronic tubes as they fire much faster than mechanical switches can operate. With no moving parts, operation of the tubes is not impaired with use.

Electronic automatic sizing control on the machines made by the company contain two Thyratron electronic tubes. The trigger tube picks up the "to size" impulse and the timer tube controls the runout period. It is said to be possible to hold bore to bore size to 0.0003-inch or less in production.

Process Bonds Linings to Brake Shoes with Adhesive

An adhesive agent used during the war years by the armed forces to replace rivets and welds on many parts of combat planes is now being employed to bond brake linings to brakes shoes for automobiles and trucks. The process, developed by Chrysler Corp., Detroit, called Cycleweld, allows an increase in braking area of 15 per cent by eliminating the conventional method of attachment.

Advantages claimed are that linings can now be worn down to their theoretical full depth. Drum scoring is also said to be eliminated. The adhesive was proved to be able to withstand extreme stresses and intense cold, as well as the extreme heat generated whenever brakes are applied. It will also withstand aging, quick temperature changes and high humidity.

KEEP ARCOS IN MIND

FOR WELDING AND CUTTING STAINLESS, ALLOY, AND NON-FERROUS METALS

ARCOS OXYARC PROCESS
A SIMPLE LOW COST PROCESS FOR CUTTING STAINLESS AND ALLOY STEELS AND NON-FERROUS METALS
ARCOS
STAINLESS AND ALLOY WELDING ELECTRODES
IF YOU WELD STAINLESS AND ALLOY STEELS, . . . and need
• ELECTRODES for arc-welding
• COILED WIRE for automatic welding
• ROD for inert gas or oxy-acetylene welding
ARCOS
STAINLESS AND ALLOY WELDING ELECTRODES

ARCOS electrodes and bare wire for the fabrication of stainless steels, and the Arcos Oxyarc Process for cutting stainless and other metals are a combination that will lower costs, increase production, and satisfy customers.

The ARCOS Demonstration Booth at the National Metal Show in Chicago October 18-27 is No. 1730

ARCOS

ARCOS CORPORATION • 306 GULF BUILDING, PHILA. 2, PA.

STAINLESS AND ALLOY WELDING ELECTRODES

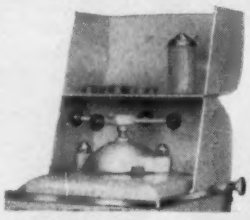
and OXYARC PROCESS FOR CUTTING METALS

FOR THE METALLURGICAL LABORATORY

"PRECISION" Jarrett
AIR OPERATED SEMI-AUTOMATIC
SPECIMEN MOUNTING PRESS

New in Design . . . Air Operated . . . Simple . . . Efficient, this new "Precision"—Jarrett mounting press offers the metallurgical laboratory a comprehensive, balanced unit that gives maximum production of perfectly mounted specimens, uniformly cured, identical in size and hardness, that can be polished with perfect assurance that the mount will not crack or fall apart.

Loading cycle requires less than one minute, and no further attention is required until curing is completed, thus releasing operator for other duties. Cabinet is uni-welded of heavy sheet steel, finished in aluminum, with all other parts either chrome plated or stainless steel. Write for Metallurgical Catalog 850S.



Mounting Press in operating position

See Your Laboratory Supply Dealer

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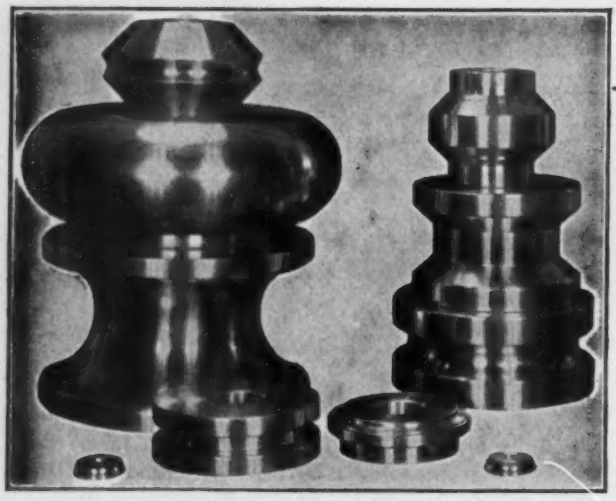
Scientific Research and Production Control Equipment



High grade rolls, made of tool steel, designed and manufactured with skill & experience by men who know rolls from all angles.....

that's the story of the National Roll and Machine Co. We are equipped to manufacture rolls of any desired profile made from your specification. Any inquiry will be given our immediate attention. Quotations given promptly.

NARMCO

NATIONAL ROLL & MACHINE CO.
954 ANSEL RD., CLEVELAND 3, OHIO

Steel Treating

(*Concluded from Page* 183)

vite scale or oxidation. It is known that any scale developing as a result of preheating is not eliminated in the final heating furnace; it is magnified. Preheating should not be continued at a temperature that will develop scale. A lower temperature that will not invite oxidation is advised.

Practically all of the manufacturers of this steel do, somewhere in their instructions for its treatment, recommend pack-hardening. From their point of view, they may be justified inasmuch as they are aware that pack-hardening does, to an appreciable, extent, eliminate soft exteriors, and that this steel is more susceptible than others. If the steel is to be air cooled (done by removing it from the compound), it is found that on reaching room temperature it has a soft exterior.

The proper answer is to remove the work from the furnace and submerge the piece in a cyanide or salt bath, immediately withdraw and air cool. The salt will prevent the attack of oxygen. When cold place in warm water to dissolve the salt. The piece will be uniform, hard, free from surface defects and without cracks or distortion.

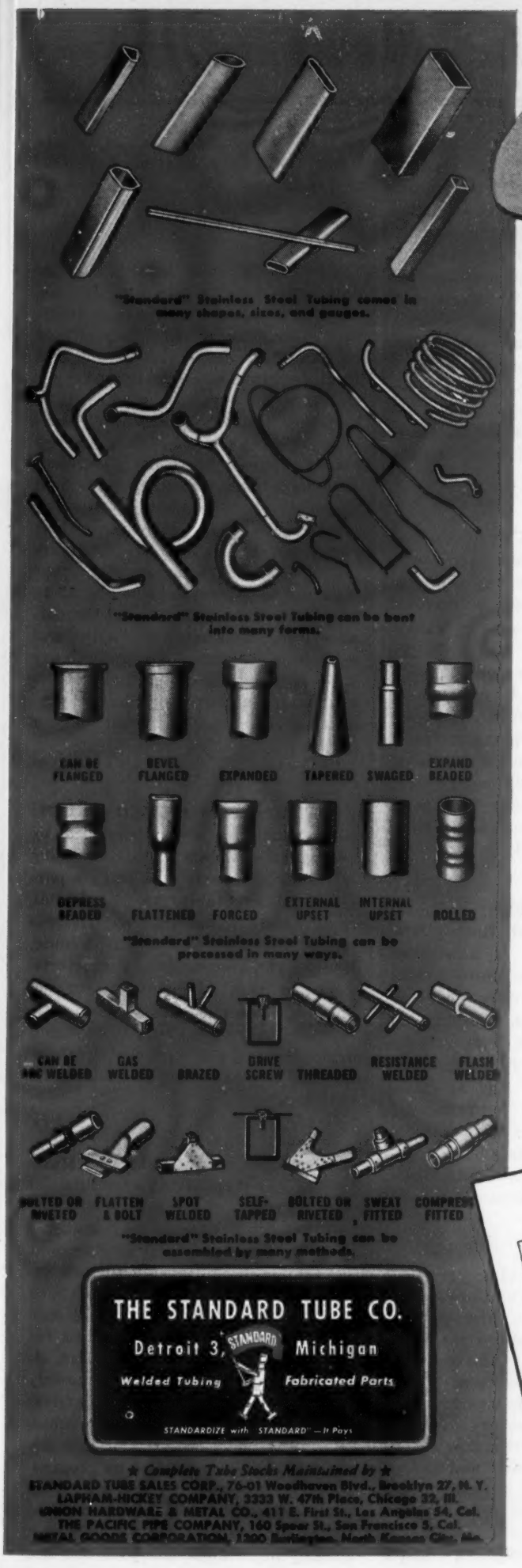
From an address before Industrial Division of New England Gas Association, Bridgeport, Conn.

FLUXED RODS FOR WELDING

Latest gas welding rods developed by Eutectic Welding Alloys Corp., New York, eliminate necessity of fluxing as a separate operation. Each rod, the company states, includes proper amount of flux in the rod itself for the particular application. Continuous presence of the flux, it is pointed out, ensures instantaneous bonding at the lowest possible temperature, and improves quality of deposited metal. Currently the company is producing the rods for all types of metals.

—o—

Commercial tube fittings, designed for heavy duty service, and 21 per cent stronger than fittings of a similar size, are manufactured by Flodar Corp., 331 Frankfort avenue, Cleveland. The cadmium plated steel fittings are made in sizes from ¼ to 1½-in.


"Standard" Stainless Steel Tubing comes in many shapes, sizes, and gauges.
"Standard" Stainless Steel Tubing can be bent into many forms.
CAN BE FLANGED
BEVEL FLANGED
EXPANDED
TAPERED
SWAGED
EXPAND BEADED
DEPRESS BEADED
FLATTENED
FORGED
EXTERNAL UPSET
INTERNAL UPSET
ROLLED
"Standard" Stainless Steel Tubing can be processed in many ways.
CAN BE ARC WELDED
GAS WELDED
BRAZED
DRIVE SCREW
THREADED
RESISTANCE WELDED
FLASH WELDED
BOLTED OR RIVETED
FLATTEN & BOLT
SPOT WELDED
SELF-TAPPED
BOLTED OR RIVETED
SWEAT FITTED
COMPRESSION FITTED
"Standard" Stainless Steel Tubing can be assembled by many methods.
THE STANDARD TUBE CO.
Detroit 3, Michigan
STANDARD
Welded Tubing
Fabricated Parts
STANDARDIZE with "STANDARD" — It Pays
★ Complete Tube Stocks Maintained by ★
STANDARD TUBE SALES CORP., 76-01 Woodhaven Blvd., Brooklyn 27, N. Y.
LAPHAM-HICKEY COMPANY, 3333 W. 47th Place, Chicago 32, Ill.
UNION HARDWARE & METAL CO., 411 E. First St., Los Angeles 54, Cal.
THE PACIFIC PIPE COMPANY, 160 Spear St., San Francisco 5, Cal.
METAL GOODS CORPORATION, 1300 Burlington, North Kansas City, Mo.

FOR QUALITY AND SERVICE SPECIFY "Standard" WELDED STAINLESS STEEL TUBING

There's always a better way to produce every product more economically for greater profit and more lasting service. More and more manufacturers are discovering that "Standard" Welded Stainless Steel Tubing is the better way to improve the design and fabrication of their present products, as well as to perfect an endless variety of new products.

You are urged to give serious consideration to the use of Welded Stainless Steel Tubing in your products, because it not only has the many structural and fabricating advantages of tubing over other physical forms; it also offers the many advantages of appearance, sanitation, corrosion and heat resistance that Stainless Steels have over ordinary steels.

For quality and service, specify "STANDARD" Stainless Steel Tubing . . . available in the various analyses for mechanical, pressure, structural, and ornamental applications. "Standard," with more than a quarter of a century experience in the manufacture of welded steel tubing, offers you interested and willing cooperation in solving your tubing problems.

"STANDARDIZE WITH 'STANDARD' —IT PAYS!"

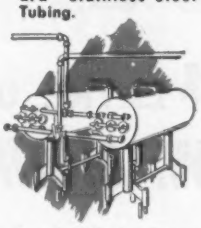
SIZE AND THICKNESS CHART

TUBE DIAMETER "O.D. SIZE	MAXIMUM WALL DECIMAL	MAXIMUM WALL B. W. GAUGE	MINIMUM WALL DECIMAL	MINIMUM WALL B. W. GAUGE
3/8"	.035"	20	.025"	23
1/2"	.035"	20	.025"	23
5/8"	.049"	18	.028"	22
3/4"	.049"	18	.028"	22
7/8"	.065"	16	.028"	22
1"	.083"	14	.028"	22
1-1/8"	.083"	14	.028"	22
1-1/4"	.083"	14	.028"	22
1-3/8"	.095"	13	.035"	20
1-1/2"	.095"	13	.035"	20
1-5/8"	.095"	13	.035"	20
1-3/4"	.095"	13	.035"	20
1-7/8"	.095"	13	.035"	20
2"	.095"	13	.035"	20
2-1/4"	.095"	13	.035"	20
2-1/2"	.095"	13	.035"	20
2-3/4"	.095"	13	.035"	20
3"	.095"	13	.035"	20

*Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.

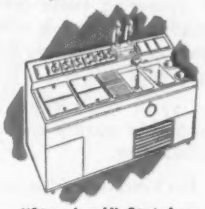
Available in all grades of chrome nickel steels, such as types 302, 304, 316 and 347

In Bus, Trolley and Railroad Cars use "Standard" Stainless Steel Tubing.

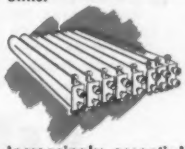


Invaluable for Dairy processing equipment.

Use "Standard" Stainless Steel Tubing for heat exchangers for chemical and other process plants.

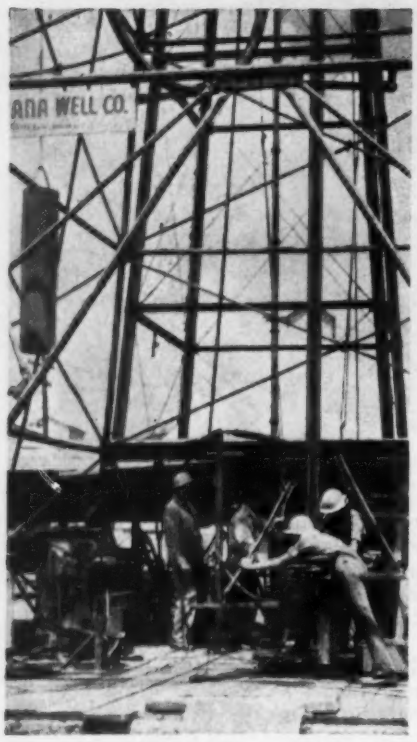


"Standard" Stainless Steel Tubing is ideal for light weight pipe lines in soda fountains and beverage dispensing units.



Increasingly essential for transmission of corrosive fluids.

More and more "Standard" Stainless is being specified for high temperature applications in aircraft and other uses.



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The city of West Monroe, Louisiana will soon have four complete Layne Well Water Supply units and an adequate supply of water to fulfill the needs of a growing and thriving oil metropolis. The first two were bought on confidence in the name Layne . . . but the third and fourth purchases were based upon known knowledge of how Layne Well Water Systems perform.

West Monroe city Officials know the cost of operating these systems, how they keep steadily on the job with little or no upkeep cost . . . and how they fulfill every claim made by Layne.

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Engineering News *at a Glance*

LENGTHENS CONCRETE LINE: Three to 5 per cent air trapped in concrete in form of tiny, individual bubbles maintains flexural strength with age, improves scaling resistance and in general protects the concrete against its most common causes of failure, it was learned by Horn Research Laboratories, Long Island City, N. Y. To capitalize on this, the firm developed an air entraining agent to bring about the above benefits. The agent, in addition, increases workability of concrete and mortars and minimizes segregation and bleeding.

COST-CUTTING PROCESS: Particular boon to the company that needs 2500 to 5000 pieces in the shortest possible time is a new permanent mold process developed by Valley Casting Corp., Central Valley, N. Y. It is equally adaptable for the production of small and large runs of aluminum castings at substantial savings. The company reports it takes only 48 hours to turn out molds from patterns of ordinary complexity. More complicated designs may take a little longer, but mold setup time is speeded tremendously.

AID FOR PIPE USERS: In New York, American Hard Rubber Co. revealed development of a plastics material which, when formed into pipe and fittings, provides excellent resistance to chemicals. Insoluble in all common solvents at temperatures of 50 to 60° C, except chlorinated solvents and aliphatic and aromatic hydrocarbons at high temperatures, the material features high impact strength. In form of threaded fittings at normal temperatures, it withstands pressures up to 50 pounds per square inch without leaking.

ROSIN-BOUND METALS: Rosin binding was used by the Germans in connection with some iron powder pressings, including alnico magnets, investigators reported recently to the Office of Technical Services, Washington. Practice as followed in the Fried Krupp Wida factory included mixing iron powder with a 50-50 mixture of sodium silicate and rosin. This mixture was then pressed hot at 180° C in an electrically heated press die to harden the rosin. Magnetic value obtained for such rosin-bonded magnets, according to the report, is lower than with sintered magnets, but their use permits more complicated forms to be produced.

"SUPER METALS" ENROUTE: In Salt Lake City, Clyde E. Williams, director of Battelle Memorial Institute, Columbus, O., told members of the American Society of Mechanical Engineers that a new group of "super metals" and ceramics soon will be available for man's new high-powered machines and atomic energy plants. These, he pointed out, will withstand higher temperatures and pressures than materials now at hand, and will offer potentialities for power generation that are "staggering." An example is an alloy that contains 60 per cent chromium, 15 to 25 per cent molybdenum and the balance iron. This must be melted and cast in a vacuum. In preliminary tests it shows up better than cobalt-base alloys, and gives promise of permitting safe use of still higher stresses.

PERFECTS LOW-PRICED SHEET: New aluminum sheet developed by Permanente Metals Corp., according to Henry J. Kaiser, president, is particularly adaptable to residential, farm and industrial applications where bending, lock seam joining, lightweight, nonrusting characteristics and ease of handling are desirable. Price of the metal is reported to be 15 per cent below "anything ever produced for sheet metal fabricators in the history of the aluminum industry."

"CUSTOM-MADE" ALLOYS: Materials produced and data so far obtained indicate that a new source of superior metals is available for industry through a metallurgical achievement of making specialized alloy steels developed by M. W. Kellogg Co., New York. Technically, the process consists of an electric ingot method for continuous metal casting in which alloying elements are fed continuously at a controlled rate into an electrical apparatus from which air is excluded, and in which an ingot of any desired analysis is produced by progressive solidification. Accuracy with which alloying elements are controlled in the process provides not only uniformity of chemical analysis, but also

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Your
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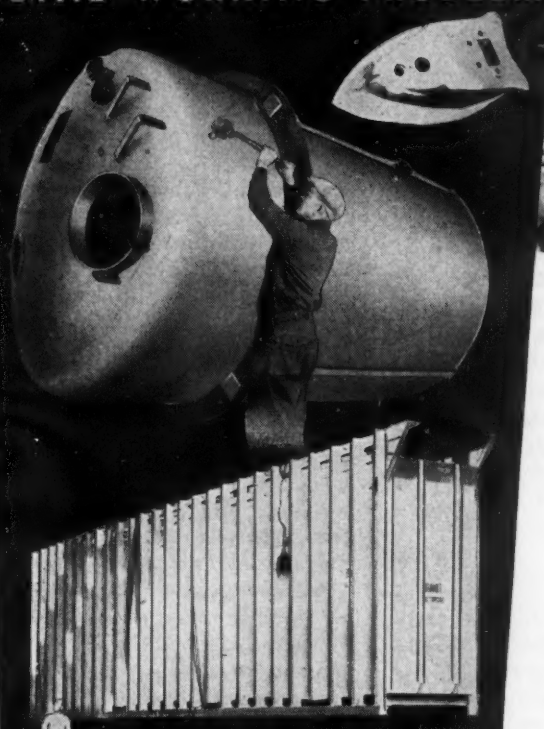

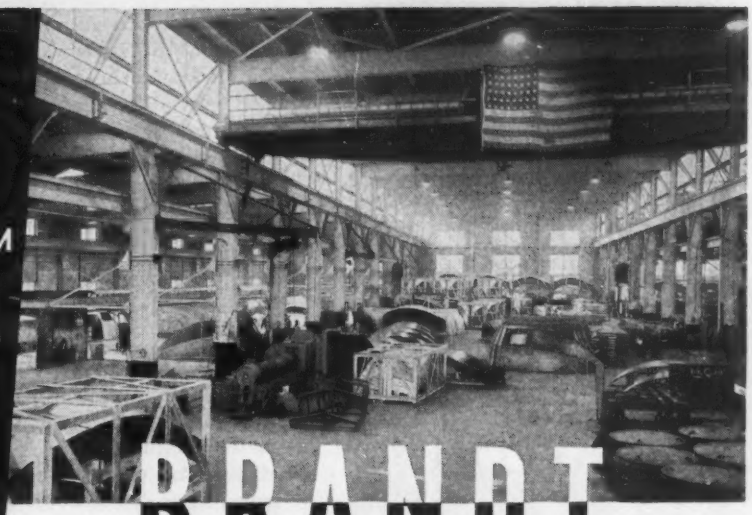

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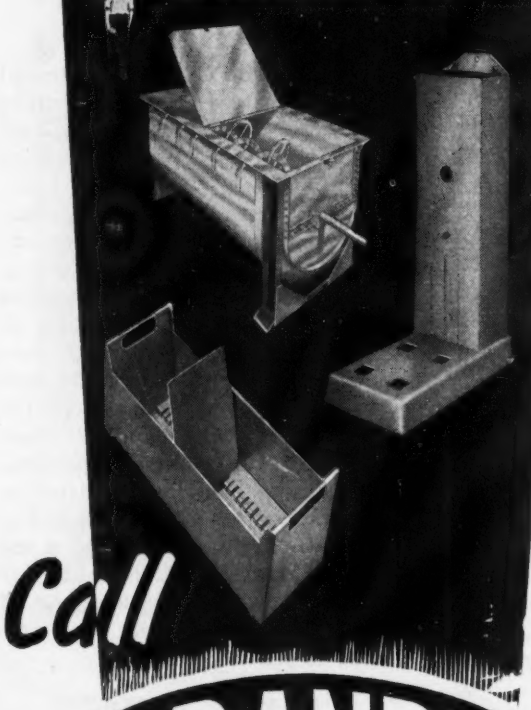

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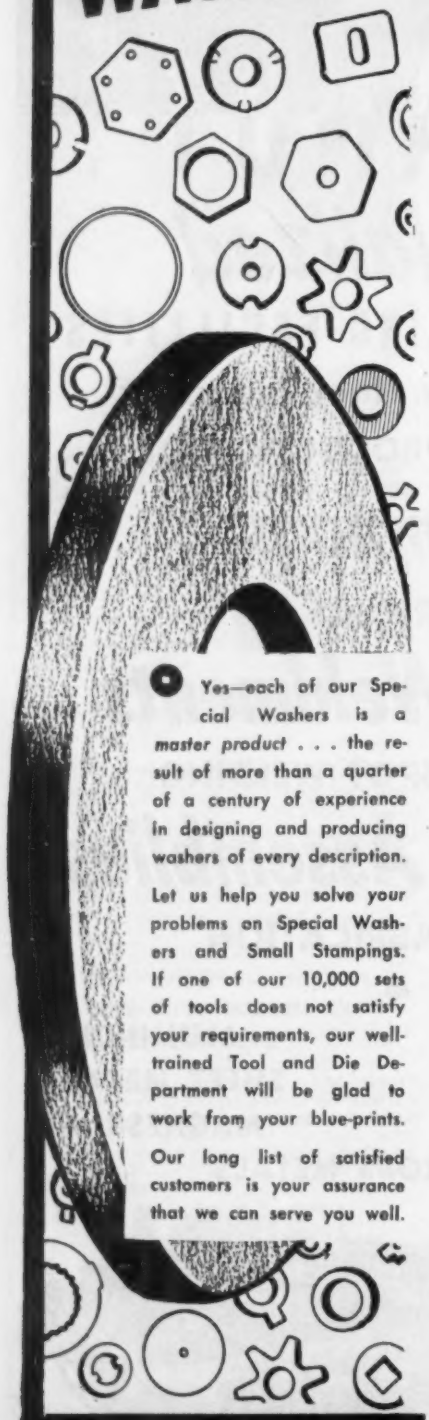

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of physical properties. Usual transfer of hot metal from ladle to mold is eliminated in the method. It can be used to produce alloys for applications involving high temperatures, such as turbine parts for jet planes; high speed tool steels, and for processing stainless steel alloys where free machining is sought as a very desirable quality.

REMOVABLE CYLINDER LINER: One of the features contributing to easy serviceability of the opposed-piston engine made by Fairbanks-Morse Co., Chicago, is the advanced type of removable cylinder liner which is cast from close-grained iron of great tensile strength. Being removable it is easy to make a replacement in case of accident. No cylinder heads, valves and a minimum of moving parts are used in this engine in which the two pistons in each cylinder are driven apart by a central explosion.

"JET HEATER": Out in Alhambra, Calif., Royal Heaters Inc. recently developed gas type heater which, without use of blowers or fans, forces out warm air at a velocity of about 250 feet per minute. This velocity is obtained through use of a venturi principle in which a restriction in the size of the upper duct forces the hot air stream to flow faster through the top of the duct and the outlets. According to the manufacturer, its performance in providing uniformity of heat is equalled only by the best forced air and hot water systems.

HARDENING TECHNIQUE: In hardening the entire outer surface of steel master pins used in heavy duty tractors, Flame Processing Corp., Minneapolis, first presses mandrels into ends of the pins until openings are expanded 0.002-inch. Pins are then flame hardened (close tolerances being maintained by using a progressive method in a small lathe which spins each pin at 450 revolutions per minute) with an Airco No. 4 Radiagraph conveying the heat and quench along the pin's length at a speed from 7 to 10 inches per minute. By depending on shrinkage of the openings, and expanding them oversize before starting, pins are easily hardened without losing tolerances. After finishing the operation, mandrel pins are removed, allowing slots to return to their original dimensions. According to the company, on a production basis, it is possible to turn out 45 pieces per hour—hardened along their entire length to a depth of 3/16-inch and to a 60-62 rockwell hardness.

CONDENSED "ATOMIC BOMB": Successful operation of a new chain reaction plant utilizing high energy neutrons for atomic fission of plutonium was announced recently by the director of Los Alamos Scientific Laboratory, the atomic energy lab operated by University of California for the U. S. Atomic Energy Commission. Known as the "fast reactor" because it utilizes fast neutrons to maintain the fission chain, the reactor was operated successfully at low power since last November. In a sense, it is a controlled version of the atomic bomb itself. It is unique in two respects: It is the first to employ fission of the man-made element, plutonium, instead of normal uranium, and it is the first to use fast neutrons. Other chain reactors utilize slow neutrons. The fast reactor is expected to speed and broaden atomic energy research. It is viewed by scientists as a valuable guide to design of future experimental reactors for power.

GIANT BATTERY: To enable Inland Steel Corp. to power large ram trucks —capable of handling 30-tons of steel at one time—Gould Storage Battery Corp., Depew, N. Y., recently incorporated over 6 tons of storage battery in a single container. Power output of the battery is equal to that of about 200 auto batteries connected as a single unit. It is capable of supplying enough current to take care of an average house for 22 days without recharging. Thus far the company completed four of these giant batteries. Unusual handling problem presented in constructing the units was solved by assembling component parts on a flat car on the Gould siding. Steel containers are 41 inches high 62 inches long and 55 inches wide. Each of the containers include 30 cells.

WATER—MIRACLE DRUG: Far from being a miracle drug, water is found by doctors at Harvard University to be a sure way of increasing worker efficiency and reducing fatigue. According to Refrigeration Equipment Manufacturers Association, Chicago, experiments at the university fatigue lab showed con-

Motor-operated
Bench Positioner
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capacity 100 lbs

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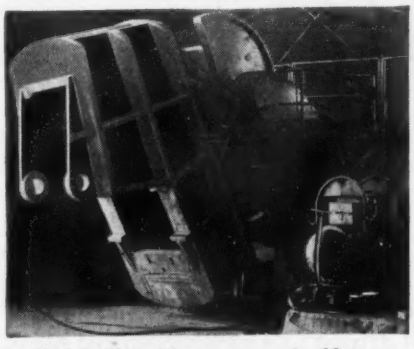

Model 400 Positioner—capacity 20 tons

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Ransome Positioners and Turning Rolls . . .
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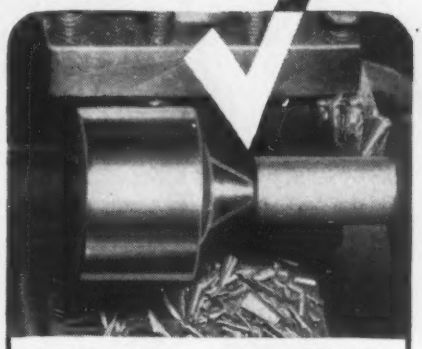
clusively that mere thirst quenching is not enough for peak efficiency. Greatest efficiency is obtained when water lost through perspiration is replaced, hour by hour, with an equivalent amount of drinking water. Yet, it was found, working men do not voluntarily drink as much water as they lose unless encouraged to drink more than thirst-quenching minimum. This can only be done by enticing them with convenient, palatable and refreshingly cool water sources.

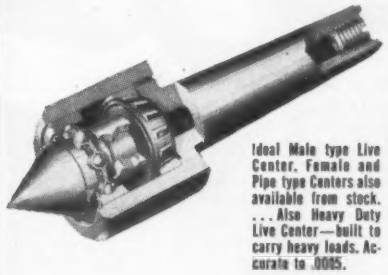
MILEAGE "WAGE" CLIMBS: In terms of tire mileage, an average industrial worker in United States today earns 2120 miles of automobile tire life per hour; in 1907 his hour's earnings purchased only 20 "miles-worth" of tire of that era, according to statistics compiled by B. F. Goodrich Co., Akron, O. A typical worker's hourly wage in 1939 could be translated into 822 tire miles, whereas today he can buy a tire that outwears prewar tires for less than prewar price—though his own wage is higher. The rubber company's study shows that average cost-per-thousand-miles-of-tire-wear was $10 in 1907, dropped to 77 cents in 1939, and now is down to 58 cents. In 1907 a man had to work 175 hours to earn enough for a tire, now he works only 12.

HEART OF A WATCH: Secret of the hairspring used in watches turned out by Hamilton Watch Co. is a new alloy, it was learned in Lancaster, Pa. Although based on an old alloy called Elinvar, it consists of added elements of 41 to 43 per cent nickel, 2.2-2.6 per cent titanium, 5.1-5.7 per cent chromium, 0.06 per cent carbon, 0.3-0.6 per cent manganese, 0.3-0.6 per cent silicon, 0.4-0.8 per cent aluminum, 0.04 per cent phosphorus, 0.04 per cent sulphur and the balance iron. The alloy is produced in 5-pound ingots and, after it is forged and rolled into rod form, it is machined so all but 2 pounds of the original ingot is lost. This 2-pound rod is then rolled and drawn into wire so fine that it provides a ribbon of wire 20 miles long, and hairsprings valued at $625,000, and sufficient for 250,000 watches using the smallest type hairspring. Some of the springs are so fine that it would take the combined thickness of five of them to equal diameter of an average human hair. They also are mirror finished to an accuracy of 1/200,000 of an inch.

Check **YOUR COSTS at this point!**



Turning 3" dia. cast iron bar at approximately 225 surface ft. per min. (⅞" wide cut, 300 rpm., .015" feed; 16" overhang)



Ideal Male type Live Center. Female and Pipe type Centers also available from stock. . . . Also Heavy Duty Live Center—built to carry heavy loads. Accurate to .0005.

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Ideal Live Centers permit deeper cuts at higher speeds because they turn with the work. No friction between the Center and the work—no burning—no gouging—none of the continued expense of fast-wearing dead centers.

Investigate the outstanding features of Ideal Live Center design and precision construction—unique bearing arrangement . . . specially selected bearings . . . short overhang . . . all parts hardened and ground . . . thoroughly tested and proved. Highest quality at no extra cost!

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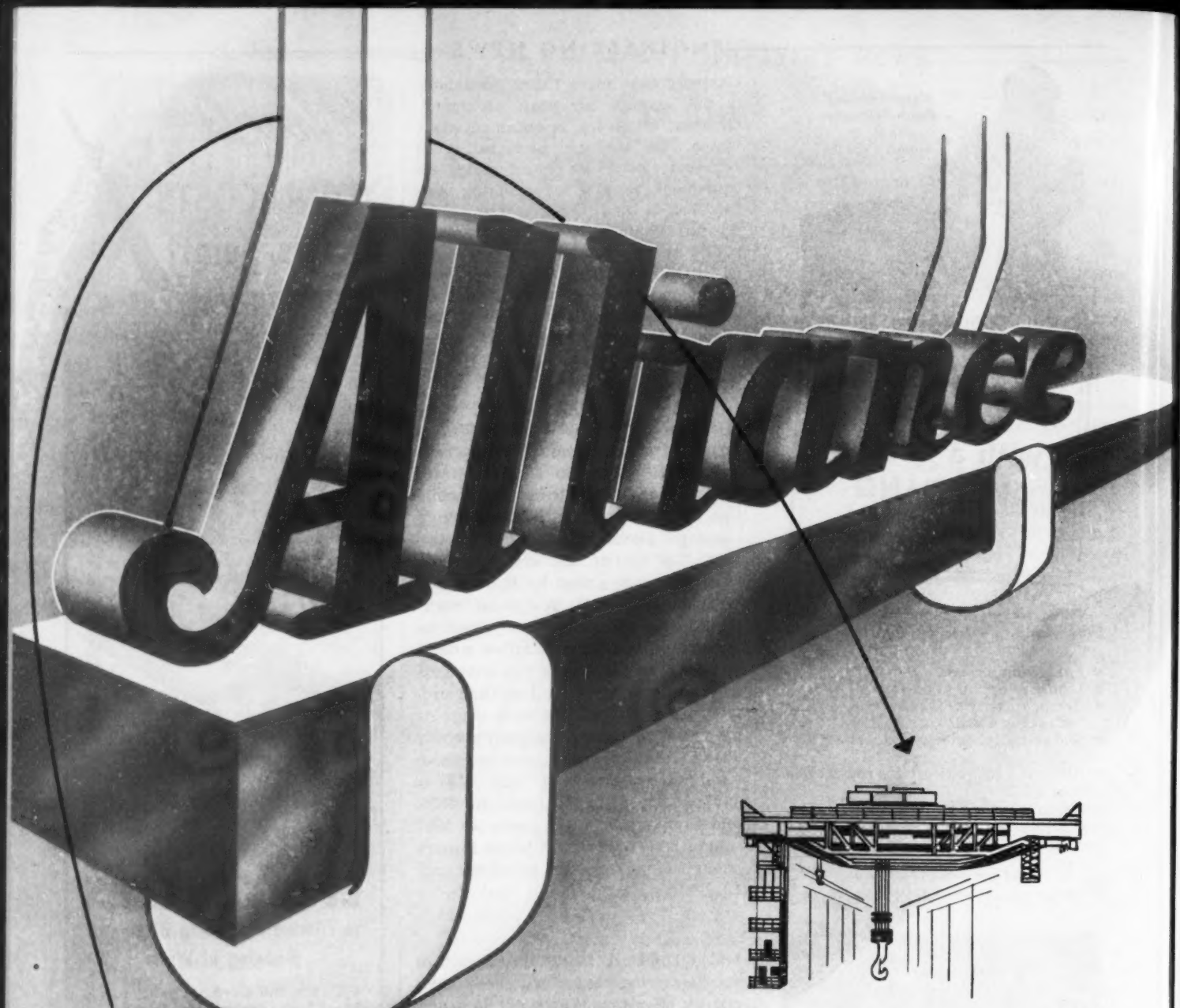

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Alliance

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 214

1. All Metal Pallet

For use either with power or hand truck, a new all-metal pallet with nesting ring is announced by Palmer-Shile Co., 16025 Fullerton Ave., Detroit 27, Mich. It can be furnished with nesting ring permanently welded to pallet, if desired.

Pallets are of corrugated rolled steel with all welded construction. Edges are beveled to allow hand truck

wheels to ride over easily. With an enamel finish, the standard pallets are of various types and sizes, including a single face pallet rack with stacking corners for handling irregular pieces and a double faced two-way pallet for power fork truck only.

2. Flame Hardening Machine

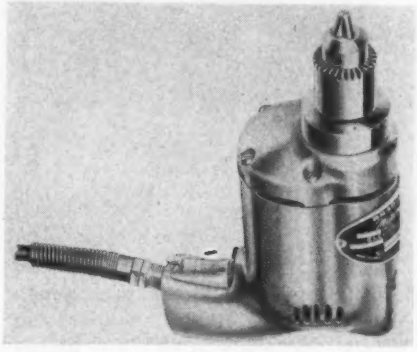
A flame hardening technique which holds parts within dimensional tolerances and to metallurgical specifications is incorporated in the Flamatic hardening machine, a development of Cincinnati Milling Machine Co., Cincinnati 9, O. An electronic temperature control system permits rapid heating of parts to the desired preset temperature and is followed by an oil quench. Surface temperature at the instant the part enters the quench is within plus or minus 5°F of the desired value in the critical transformation range.

Rapid heating makes it possible to confine heat to surface of the part, leaving the core relatively cool, and permitting core properties to be established by previous heat treatment. Uniform depth of heat penetration is achieved, which with the oil quench, results in negligible distortion.

Machine will accommodate a range of parts including shafts up to 18 inches long, with diameters to 8 inches. Equipped with standard flame heads, gears, shafts, barrel type cams, pinions and other parts that lend themselves to rotation may be hardened. Basically, the machine consists of a work table built over a conveyorized quench tank, flame head assemblies adjustably mounted on the work table and a spindle to which a work holding device is attached, centered between the flame heads. Operation is automatic except for loading.

3. Palm Drill

Bradford Machine Tool Co., Cincinnati, O., is manufacturing a ¼-in. palm drill which is completely one-hand operated and which features a



hand-fitted pistol grip. Incorporated in the grip is a trigger switch for intermittent use which can be locked for continuous operation or released with one finger of the gripping hand.

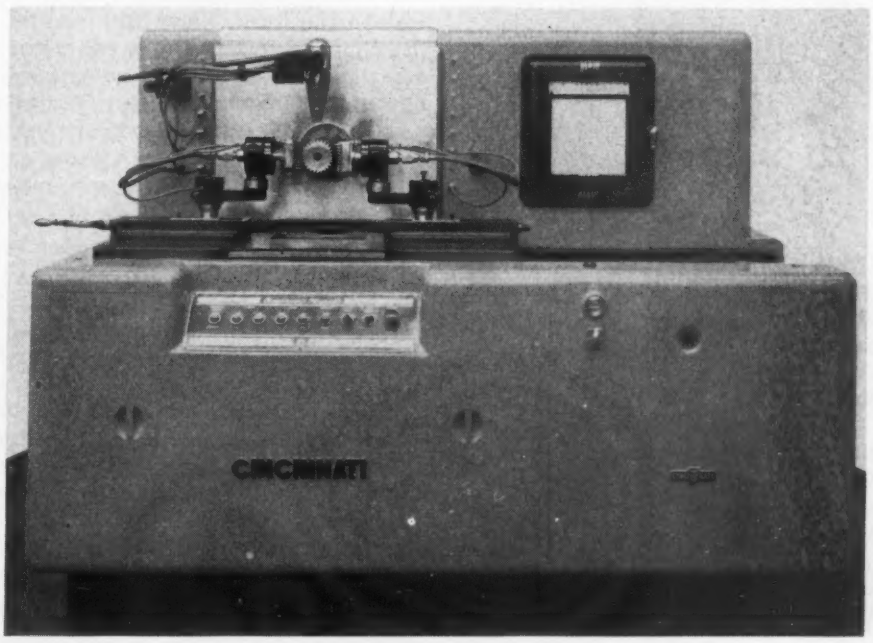
All bearings are ball bearings and heat treated chrome-molybdenum steel helical gears are used throughout. A 3-jaw Jacobs chuck with key (permanently attached to cable) and 15 ft of three-conductor cable are included. Drill capacity is ¼-in. in steel and ½-in. in hardwood. Its 110 v ac-dc motor drives the drill at 1100 rpm with full load or at 1900 rpm with no load. Motors in other voltages can be supplied.

4. Rubber Injection Machine

Hydraulic Press Mfg. Co., Mt. Gilead, O., announces an injection molding machine which processes rubber in almost any form. Called the Turbojector, it forces stock into a mold cavity at an elevated temperature only a few degrees under mold temperature, eliminating preheating.

Featuring a maximum injection pressure of 18,000 pounds, the machine can handle 3 to 4 pounds of material per shot, with parts having a developed area up to 90 square inches. Handling up to 5 pounds of material per minute, the feed screw of the machine has a stepless speed range of from 50 to 150 revolutions per minute.

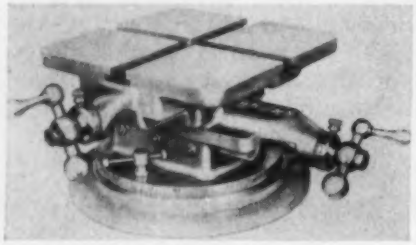
Turbojector heat is obtained from



friction of its feed screw and the obstruction of the baffle gears. This is distributed uniformly throughout the cross section. Pressure-mixing of material during injection process makes for parts with better physical properties.

5. Sliding Table

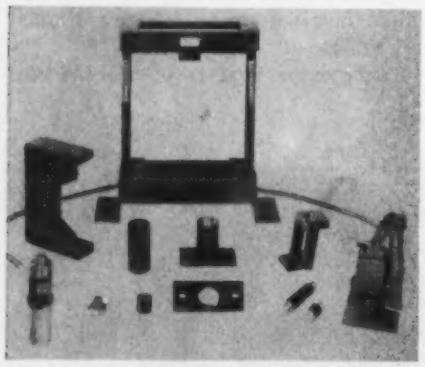
Rotary base two way sliding table with its base graduated to 360 degrees is announced by Leo G. Brown Engineering Co., 1127 Riverside Dr., Los Angeles 31, Calif. Top surface measures 7½ in. square and is



mounted on two screw equipped slide ways with 6 in. travel, set at 90 degrees of each other. Two clamping screws in base lock table at any angle. Overall height is 4¼-in. and weight is 35 lb.

6. Mobile Power Unit

Developed to reduce the time and labor required for various maintenance, repair and production operations, the Mobil-Powr unit, manufactured by Munton Mfg. Co., Franklin Park, Ill., is foot actuated, enabling



the operator to keep both hands free during work. The standard portable unit consists of a 7-ton hydraulic jack with 3-in. ram stroke, a foot power pump mechanism and an 8-ft hydraulic line with swivel coupling.

Attachments are available as auxiliary equipment to broaden its use. Combined with a press frame, it becomes a hydraulic press. Other attachments are pulling bar, lifter bar, jack plate, 3 to 30 in. extension rods, couplings for rods and C clamps. Unit is adaptable to lifting, pulling, spreading, clamping, holding and as a gear puller. Jack and attachments are illustrated.

7. Flash Trimming Unit

Arranged for removing flash or upset from resistance or butt welds, the hydraulically driven draw cut, light type flash trimming machine, built by Morton Mfg. Co., Broadway and Hoyt, Muskegon Heights, Mich.,

is offered in sizes from 8 to 12 inches of trimming capacity and 1/8-inch metal thickness. It has an operating distance approximating 40 inches from center of rams to floor. Provision may be made for either flat strip or circular bands.

Operating cycle of machine is automatic. Work is placed over the lower horn, upper ram unit, actuated by a foot starter, automatically lowers and clamps the work. Rams trim on the draw cut or inward stroke and when completed the upper ram automatically lifts 1 1/2-inches, both returning to the outward position and stopping. Each ram is provided with three or more tool holders, depending upon material thickness and analysis.

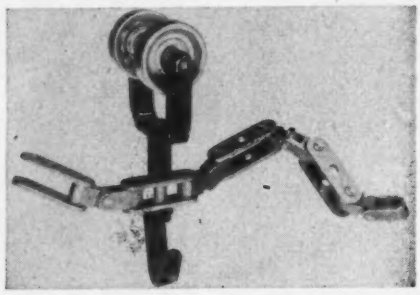
8. Voltage Regulator

Completely electronic, with no moving parts, the Stabiline instantaneous voltage regulator, made by Superior Electric Co., 540 Laurel street, Bristol, Conn., provides correction of line voltage fluctuations with negligible waveform distortion necessary in laboratory and industrial voltage regulation applications.

Tests under all conditions of operation have shown that output voltage is held to within plus or minus 0.1 v of any nominal value in the settable output range between 110 to 120 v for an input line voltage change from 135 to 95 v. Time for recovery usually is in the order of 3 to 6 cycles. Waveform distortion does not exceed 3 per cent.

9. Conveyor Chain

Introduced by Leeds Electric & Mfg. Co., Hartford, Conn., the Multi-Plane conveyor chain may be bent on the horizontal plane as much as 45 degrees to the reverse of the

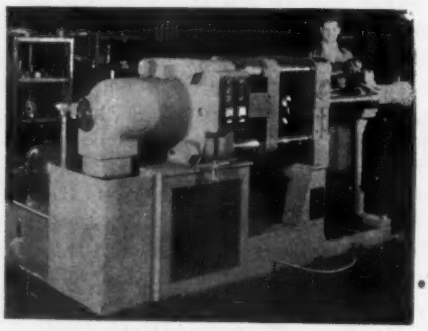


direction of travel on either side. Designed for use with Leeds overhead conveyors and infrared systems, the chain may also be used for degreasing operations and oven work where greased chains are not practical as well as on small radius curves and where sharp bends on different planes follow each other.

Chain consists of two milled pieces rounded at outer ends and cut for male and female connection in middle with a steel pin. Outer ends are drilled for fastening together with a stamped steel flat link on each side.

10. Gear Finisher

Simultaneous finishing of two or more gears in tandem is possible with the rack type gear finisher developed by Michigan Tool Co., 7171



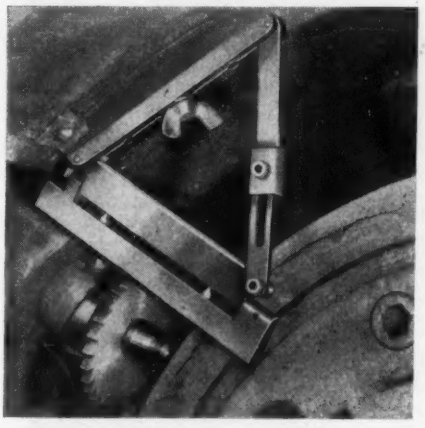
East McNichols Rd., Detroit 12, Mich. Hydraulic in operation, the machine has a duplex head and tailstock, permitting one gear to be mounted between centers and another on a stub arbor immediately ahead of the cen-

ters. The hydraulic clamping provided for the centers is interlocked with the machine operation; it cannot be started until gears are mounted.

To shave two or more gears at a time, the gears must be of the same pitch and pressure angle. They may be of different diameters and face width. Gears are mounted on a crossed axis to the axis of the serrated rack blades and are given a transverse motion while rolling in mesh with the reciprocating rack. Cycling of machine is completely automatic.

11. Wheel Dresser

A device designed to hold the diamond tool against the wheel in such a way as to produce a uniform rotation of the diamond and cause a new face to be presented to the wheel with each pass, is the Diamond-Miser, introduced by Diamond-Detroit Inc., Detroit. This periodic and uniform rotation of the diamond tool serves to maintain the proper shape of the diamond.

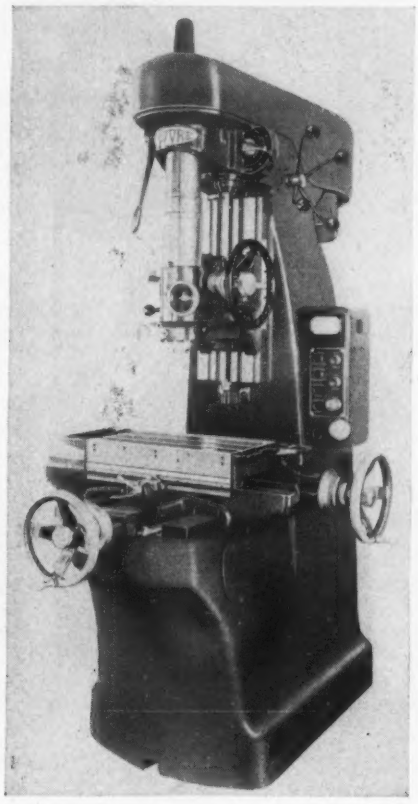


With a point constantly presented to the wheel being dressed, a flat can not develop. Tool is available in three different models. Model DMC2 automatically rotates the diamond tool by means of a cog wheel and trip, while model DMN1 provides for hand indexing in front and DMB51 has indexing disk in rear. They may be used on almost every type of grinder that uses diamond dressing tools.

12. Jig Borer

Using the principle of accurate lead screws for precise table settings, the new jig borer, announced by Moore Special Tool Co. Inc., Bridgeport, Conn., provides for heavier cut and larger holes. Known as the No. 2 model, the machine will jig-bore holes up to 5 inches in mild steel or cast iron. It provides infinitely variable spindle speeds, push button controlled, with a range from 90 to 2400 revolutions per minute.

Three power feed ratios — 0.0015, 0.003 and 0.006-inch per revolution of spindle in either direction, centralized control panel and tachometer for spindle speeds and one-shot lubrication, disconnect clutch for easy indicating and a trip mechanism which prevents jamming of lead screw nuts through over travel are features. Drive mechanism is entirely enclosed. All controls are within easy reach of a seated operator.



13. Multiplug Outlet Box

Problem of coping with an insufficient number of wall outlets is answered by the multiplug outlet box, model 3001-A, made by Allied Laboratory Instrument Inc., 355 West 26th street, New York 1. The 3 x 4 x 5 in. unit contains eight standard receptacles and may be plugged into any convenient wall outlet, 110-125 v ac or dc.

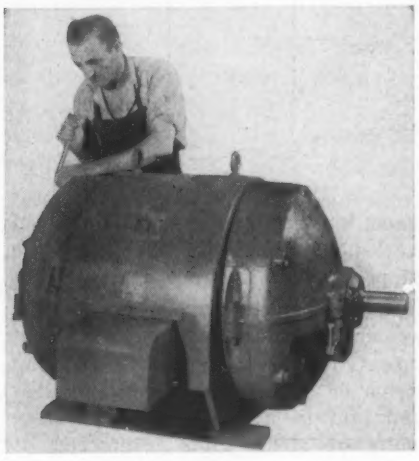
Unit may be used where an electrical circuit is needed temporarily, as in the case of temporary lighting fixtures or where a permanent circuit is needed to enable a large number of instruments or machines to operate from a small number of wall outlets. In addition, boxes may be plugged into each other. Two fuses protected the main line against shorts and overloads.

A 1/25 w neon pilot light tells alternating from direct current and signals that circuit is live. The long stroke toggle switch breaks both legs of the line. It may also be supplied with adapters for British type plugs and for use on 220-250 v.

14. Squirrel Cage Motors

Two-pole squirrel cage induction motors for such high speed applications as boiler feed pumps, pipe line pumps, compressors, blowers and centrifugal pumps, are offered by Electric Machinery Mfg. Co., Minneapolis 13, Minn. They are rated from 200 to 700 hp at 3600 rpm for NEMA class B starting (normal torque, low current), favorable for across-the-line starting. Construction is drip proof.

Motors have Kolene process centrifugally cast bearing sleeves. Pressure lubricated bearings are available. Split bearing brackets permit easy access to bearings. Windage noise is lessened by design to avoid abrupt acceleration or air. Cage winding is phos-copper braze welded.



15. Furnace Lighter

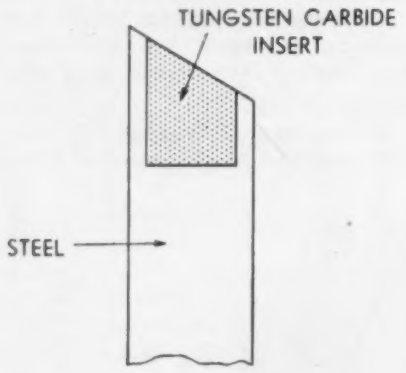
Embodying a feature which permits it to stay lit regardless of the atmosphere or back pressure in the furnace, the new furnace lighter manufactured by Sunbeam Stewart Industrial Furnaces Division of Sunbeam Corp., 4433 West Ogden avenue, Chicago 23, centers its combustion in a perforated heat resisting alloy nozzle tip which is heated to incandescence. The mixer assembly has a two-valve control in the handle at the operator's fingertips.

Lighter uses a mixture of gas and air to give a flame which may be used to light either a gas of oil fired furnace of any size. It is connected through a light, flexible hose to low

pressure air supply and gas supply (natural, bottled or manufactured). Gas and air are mixed in the low pressure injector assembly and are carried through a steel tubing to the perforated nozzle tip.

16. Work Rest Blade

Combining the hardness of tungsten carbide with the strength of steel, a new centerless grinder work rest blade has been developed by Cliff Co., 17 North Leclaire Ave., Chicago 44, Ill. Extending the blade's potential life almost indefinitely, the



blade, in strenuous tests, has reduced work-hour blade-cost as much as 85 per cent in some operations.

Design of blades features at the wearing surface sectional inserts of tungsten carbide separated by thin strips of a specially developed alloy and laid in a slot with supporting walls of steel. Thus reinforced it provides a tungsten carbide surface for rough grinding and other operations.

The blade may be used on various types of centerless grinding operations, including jobs on stainless, aluminum, brass, alnico, tool steel and various other metals.

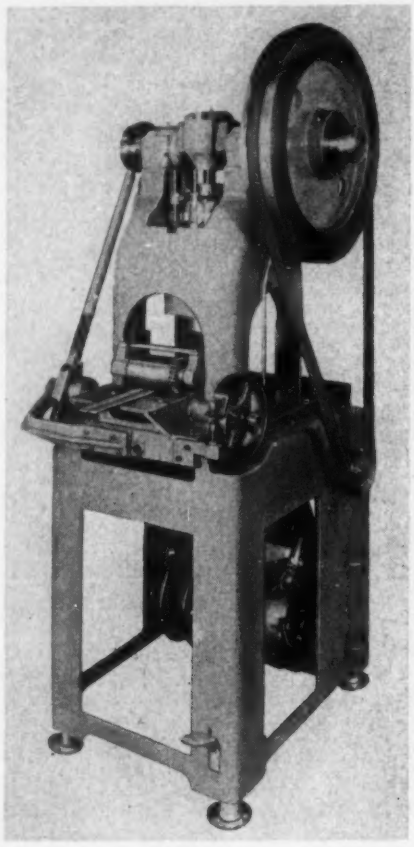
17. Automatic Punch Press

Automatic roll feed and variable speed drive are features of the 12-ton high speed automatic punch press introduced by Di Machine Corp., 2711 West Irving Park Rd., Chicago 18, Ill. Standard die sets measuring up to 8 1/2 x 6 1/4-inches may be accommodated as well as special die sets measuring 8 x 12 inches. Shut die height over the bolster plate is 6 inches.

Stock to 4 1/2-inches may be used and length of feed is adjustable to 6 inches.

The mechanism provides accurate feeding for use of progressive dies as well as for use of blanking or compound dies. Variable speed drive permits operation between 65 and 300 strokes per minute.

Standard equipment consists of clutch for single stroke operation, automatic brake release, hardened and ground feed rollers, knock-out bar in the ram, stock guides, motor and



starter. Power is supplied by a 1 1/2-horsepower, 1725 revolutions per minute, 220 volts, 60 cycle, 3-phase, alternating current motor mounted under bed. Press is offered with a 1, 1 1/2 or 2-inch stroke.

18. Floor Compound

Designed to repair holes permanently and resurface concrete or plank floors in a minimum of time, Swift Floor, made by Monroe Co., 1076F Quebec avenue, Cleveland 6, will hold 50,000 lb loads 1 min after application. Working as well indoors as out, it will not crack, curl or crumble. It's resilient but hard surface is constantly improved by heavy traffic.

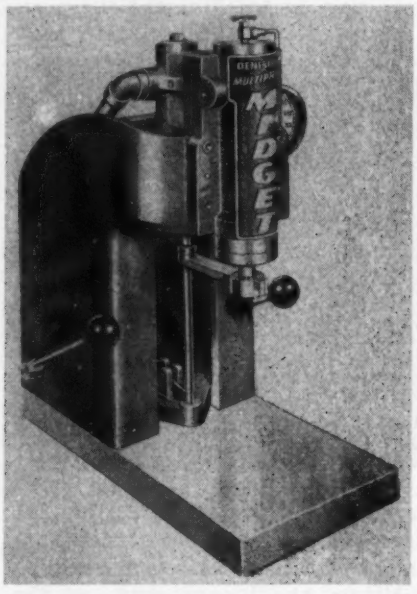
19. Sludge Tanks

Self-cleaning by virtue of pipe conveyors having synthetic rubber flights mounted on sealed pin chains, two new sludge tanks developed by Hapman Conveyors Inc., 2405 West McNichols, Detroit 21, operate on a 1/6 or 1/3 hp motor, depending upon tank size. Pipe conveyors will operate in any plane. Double V bottom permits rapid sludge settling and quick removal.

Series of five baffles retards coolant flow uniformly over tank area providing maximum sludge settling capacity. Tanks are suitable for any noncorrosive sludge which will readily settle. Temperature is limited to 270° F. Junior size has a 400 gal capacity and standard, 3200 gal.

20. Small Hydraulic Press

Pressing equipment between 200 and 2000 lb ram effort may be fulfilled with a multipress Midget hydraulic press offered by Denison Engineering Co., Columbus 16, O. It is suited for multiple installations and for successive operation requirements. One centralized power source will operate up to 12 units. When more than one press is used,



each has individual pressure adjustments.

Press may be operated in any position and is easily adaptable to other hydraulic machinery as an accessory unit for pressing, clamping, feeding and other production operations. Three different base plate designs, plus nonrotating ram guides, interchangeable valves for manual or vibratory action, adjustable day-light and throat depth clearances and choice of three pumping units are included in optional equipment available.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Steelmakers Trim Fourth Quarter Consumer Quotas

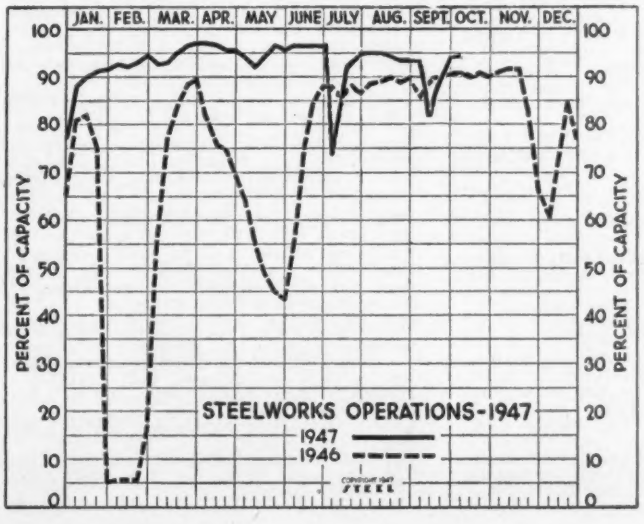
Seek to effect balance in order books before end of year. Actual shipments into consumption in last three months likely to top preceding period with larger output and smaller exports in prospect. Prices firm with strong undertone developing in scrap market

CONSUMERS' steel allotments for fourth quarter are being trimmed sharply to permit the mills to bring their order books into some semblance of balance by the end of the year. Carryover tonnage from third quarter was so large it is estimated that at least two-thirds of fourth quarter potential output will be taken up in clearing away the overflow.

Barring major disruptions in production, and at the moment no such threat is in sight, consumers' actual steel receipts in fourth quarter should be somewhat larger than in the preceding period if for no other reasons than that there were production disruptions in third quarter which seriously cut down output, and, further, less steel probably will be exported from now until the end of the year while export licensing undergoes adjustment and export quotas are being belatedly set up.

Domestic manufacturing industries, despite the favorable supply developments alluded to above, will receive far less steel than they can use in the closing months of the year. This will be especially true in the light flat-rolled products, plates, shapes, pipe and hot-rolled carbon bars.

Steelmaking capacity will undergo some expansion before the end of the year, but there is some question whether it will be possible for the industry to immediately pass along the full benefit of this enlargement to consumers because of the serious lag in metallics supply. Scrap inventories at steel plants are larger than a year ago. Still, on the average, they are substantially less than desired, especially with the winter and poor collection season just ahead. Reflecting this condition, a stronger price undertone is developing in the scrap markets.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Oct. 4	Change	Same Week 1946	Same Week 1945
Pittsburgh	101.5	+ 3.5	97.5	74.5
Chicago	94.5	+ 0.5	91	91.5
Eastern Pa.	91.5	— 0.5	81	76
Youngstown	92	None	90	76
Wheeling	81.5	— 7.5	86	88
Cleveland	90.5	None	91	82
Buffalo	88.5	None	90.5	86
Birmingham	99	None	99	95
New England	80	— 3	92	82
Cincinnati	87	— 7	78	77
St. Louis	77.5	— 0.5	72.5	68
Detroit	94	None	76	84
Estimated national rate	94.5	+ 0.5	90.5	82

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

At the same time, pig iron supply has seldom, if ever, been more acute with capacity down about 2,500,000 tons from the war peak and down relatively more sharply than ingot capacity from the high level of 1945. Actual monthly pig iron output is down approximately 500,000 tons from January, the high mark for this year and the highest, in fact, since the spring of 1945.

Relative price stability appears to have been attained in the steel market but further advances are likely should costs continue to rise. For example, higher warehouse delivered prices are expected to immediately follow in the wake of any increase in freight rates which may be allowed by the Interstate Commerce Commission. Last week a number of price increases were put into effect as of Oct. 1. For example an increase of 6 to 9 per cent was effected on bolts and nuts. Ferromanganese prices were raised $10 per ton as of that date, and ferroalloy prices in general were raised in varying amounts.

STEEL's composite price average on steelmaking scrap rose fractionally last week to $37.92 from $37.82 the preceding week. Other composite market averages held firm at $75.41 for finished steel, $56.80 for semifinished steel, and $36.13 for steelmaking pig iron.

Steelmaking operations increased fractionally last week, the national ingot rate rising ½ point to 94.5 per cent of capacity, equivalent to output of 1,652,000 net tons against 1,647,000 the preceding week. In the Pittsburgh district a gain of 3½ points to 101.5 per cent of rated capacity was reported, while Chicago district operations advanced ½ point to 94.5 per cent. Declines were noted at several other points, Wheeling falling off 7½ points to 81.5 per cent, Cincinnati dropping 7 points to 87 per cent, New England 3 points to 80 per cent, St. Louis ½ point to 77.5 per cent, and eastern Pennsylvania ½ point to 91.5.

COMPOSITE MARKET AVERAGES

	Oct. 4	Sept. 27	Sept. 20	One Month Ago Sept., 1947	Three Month Ago July, 1947	One Year Ago Oct., 1946	Five Years Ago Oct., 1942
Finished Steel	$75.41	$75.41	$75.41	$75.41	$70.80	$64.45	$56.73
Semifinished Steel	56.80	56.80	56.80	56.80	53.04	40.60	36.00
Steelmaking Pig Iron	36.13	36.13	36.13	36.14	33.82	27.50	23.00
Steelmaking Scrap	37.92	37.83	37.83	37.83	37.23	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. **Semifinished Steel Composite:**—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. **Steelmaking Pig Iron Composite:**—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. **Steelworks Scrap Composite:**—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Oct. 4, 1947	Sept., 1947	July, 1947	Oct. 1946
Steel bars, Pittsburgh	2.90c	2.90c	2.66c	2.50c
Steel bars, Philadelphia	3.28	3.28	2.98	2.86
Steel bars, Chicago	2.90	2.90	2.66	2.50
Shapes, Pittsburgh	2.80	2.80	2.56	2.35
Shapes, Philadelphia	2.94	2.94	2.64	2.48
Shapes, Chicago	2.80	2.80	2.56	2.35
Plates, Pittsburgh	2.95	2.95	2.71	2.50
Plates, Philadelphia	3.15	3.15	2.85	2.558
Plates, Chicago	2.95	2.95	2.71	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.56	2.425
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.27	3.275
Sheets, No. 10 galv., Pittsburgh	3.90	3.90	3.63	†4.05
Sheets, hot-rolled, Gary	2.80	2.80	2.56	2.425
Sheets, cold-rolled, Gary	3.55	3.55	3.27	3.275
Sheets, No. 10 galv., Gary	3.90	3.90	3.63	†4.05
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.56	2.45
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.27	3.05
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.475	3.05
Wire nails, Pittsburgh	4.25	4.25	3.975	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$53.20	$38.00
Slabs, Pittsburgh, Chicago	47.50	47.50	43.60	39.00
Rerolling billets, Pittsburgh	47.50	47.50	43.60	39.00
Wire rod $\frac{5}{16}$ to $\frac{1}{4}$-inch, Pitts.	2.925c	2.925c	2.63c	‡2.30c

‡ Base, No. 5 to $\frac{5}{16}$-in.

Pig Iron

	Oct. 4, 1947	Sept., 1947	July, 1947	Oct. 1946
Bessemer, del. Pittsburgh	$37.83	$37.83	$36.03	$29.77
Basic, Valley	36.00	36.00	34.20	28.00
Basic, eastern del. Philadelphia	38.72	38.72	36.47	29.93
No. 2 fdry., del. Pgh. N. & S. sides	37.33	37.33	35.53	29.27
No. 2 fdry., del. Philadelphia	39.22	39.22	36.97	30.43
No. 2 foundry, Chicago	36.00	36.00	34.20	28.50
No. 2 foundry, Valley	36.50	36.50	34.70	28.50
Southern No. 2, Birmingham	34.88	34.88	31.98	24.88
Southern No. 2, del. Cincinnati	39.75	39.75	36.85	28.94
Malleable, Valley	36.50	36.50	34.70	28.50
Malleable, Chicago	36.50	36.50	34.70	28.50
Charcoal, low phos., fob Lyles, Tenn.	44.00	44.00	43.00	33.00
Ferromanganese, fob cars, Pittsburgh	151.00	140.25	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$38.00	$38.00	$37.20	$20.00
Heavy melt. steel, No. 2, E. Pa.	37.00	36.75	38.06	18.75
Heavy melt. steel, No. 1, Chicago	38.75	38.75	35.95	18.75
Heavy melt. steel, No. 1, Valley	40.50	39.50	37.35	20.00
Heavy melt. steel, No. 1, Cleveland	38.25	38.25	37.65	19.50
Heavy melt. steel, No. 1, Buffalo	39.50	39.00	37.90	19.25
Rails for rerolling, Chicago	46.25	46.25	43.20	22.25
No. 1 cast, Chicago	43.50	43.50	41.10	25.00

Coke

Connellsville, beehive furnace	$12.00	$12.00	$11.20	$8.75
Connellsville, beehive foundry	14.50	14.50	13.05	9.50
Chicago, oven foundry, del.	18.50	18.50	17.46	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $45-$50, sales by smaller interests on negotiated basis at $65 or higher.

Forging Quality, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $60; sales by smaller interests on negotiated basis at $66 or higher.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69.

Wire Rods: Pittsburgh, Chicago, Birmingham, $\frac{7}{32}$ to $\frac{1}{4}$-in., inclusive $2.80-3.05 per 100 lb. Galveston base, $2.95. Worcester, 2.90c. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.31c; Phila., del., 3.28c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.58c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.00c; New York, del., 3.09c; Los Angeles (base, del), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 3.96c; Philadelphia, del., 3.93c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.85c-3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.05c; New York, del., 4.24c; Philadelphia, del., 4.15c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.95c-4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.45c-4.55c; copper-iron or pure iron, 4.80c-4.90c. Granite City 4.65c and 5.00c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.) 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.90c-3.95c; Granite City, 4.05c; Detroit, del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c. Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c. Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c, over 0.60 to 0.80, 5.65c; over 0.80 to 1.00, 7.15c; over 1.00, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.90c; Granite City, Birmingham, Sparrows Point, 4.00c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $14.10.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c; Geneva, Utah, (base, del.), 3.125c; New York, del. 3.24c; Phila., del., 3.15c; St. Louis, del., 2.77c; Boston, del. 3.38c; San Francisco and Los Angeles, del., 3.59c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.

(Central Iron & Steel Co., Harrisburg, Pa., 4.15c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Pittsburgh, Washington, Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.00c; Phila., del., 2.94c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.44c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.55-3.80
Spring (except Birmingham)	**$4.25-**4.50

Wire Products to Trade

Nails

Standard and cement-coated	†$4.25
Galvanized	‡$4.00
Staples, polished and galvanized	$4.25

Wire, Merchant Quality

Annealed (6 to 8 base)	§$4.20
Galvanized (6 to 8 base)	§$4.65

(Fob Pittsburgh, Chicago, Birmingham, per base column)

Woven fence, 15 gage and heavier	††91
Barbed wire, 80-rod spool	††101
Barbless wire, twisted	101
Fence posts (no clamps)	††90
Bale ties, single loop	††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del) $4.56 for bright basic only.

** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.

‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del) $5.08.

§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66, galvanized.

†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.00c-4.50c; screw spikes, 5.80c-6.40c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

	Butt Weld		Butt Weld
In.		In.	
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.98	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2¼"	12	20.47	24.54	19.86	23.80
2½"	12	22.42	26.87	21.75	26.06
2¾"	12	23.76	28.48	23.05	27.63
3"	12	24.93	29.90	24.18	29.00
3¼"	11	29.03	34.81	28.16	33.77
3½"	11	31.17	37.39	30.23	36.27
4"	10	38.69	46.38	37.53	44.99
4½"	9	51.28	61.50	....	....
5"	9	59.39	71.18	....	....
6"	7	91.13	109.27	....	....

Pipe, Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $85.06, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B. Prices effective as of July 24, 1947.

Bolts, Nuts

(Lower prices as published in Sept. 29 issue of STEEL quoted by some producers pending revision of price schedules.)

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 7⅝ off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅛-in. and smaller	46 off	....
½-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
⅝-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws
(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
½-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl $1-$2 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	50.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	83.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	22.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	28.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$37.50	$37.00	$38.50	$38.00
Newark, N. J., del.	39.34	38.84	40.34	39.84
Brooklyn, N. Y., del.	40.50	....	....	41.00
Philadelphia, del.	39.22	38.72	40.22	39.72
Birdsboro, Pa., base	40.50	40.00	41.50	41.00
Birmingham, base	33.38*	32.88*	....	....
Baltimore, del.	39.78	....	....	....
Chicago, del.	37.12	....	....	....
Cincinnati, del.	38.25	....	37.75	....
Newark, N. J., del.	39.46	....	....	....
Philadelphia, del.	38.84	....	....	....
St. Louis, del.	37.37	....	36.87	....
Buffalo, base	*36.00	*36.00	37.00	*36.50
Boston, del.	42.48	42.48	43.48	42.98
Rochester, del.	37.84	37.84	38.84	38.34
Syracuse, del.	38.50	38.50	39.50	39.00
Canton, Massillon, O., base	36.00	35.50	....	36.50
Chicago, base	36.00	35.50	37.00	36.50
Milwaukee, del.	37.32	36.82	38.32	37.83
Muskegon, Mich., del.	39.83	....	....	40.33
Cleveland, fob furnace	*36.00	*35.50	37.00	*36.50
Akron, del.	37.67	37.17	38.67	38.17
Duluth, base	36.50	36 00	37.50	37.00
Erie, Pa., base	36.00	35.50	37.00	36.50
Everett, Mass., base	45.00	....	....	45.50
Granite City, Ill., base	37.00	36.50	....	37.00
St. Louis, del	37.75	37.25	....	37.75
†Neville Island, Pa., base	36.50	36.00	37.00	36.50
Pittsburgh, del., N.&S. Sides	37.33	36.83	37.83	37.33
Provo, Utah, base	36.50	36.00	....	....
Seattle, Tacoma, Wash., del.	42.44	....	....	....
Portland, Oreg., del.	42.44	....	....	....
Sharpsville, Pa., base	36.50	36.00	37.00	36.50
Steelton, Pa., base	37.50	37.00	38.50	38.00
Struthers, O., base	37.00	36.50	37.50	37.00
Swedeland Pa., base	41.50	41.00	42.50	42.00
Troy, N. Y., base	38.00	37.50	39.00	38.50
Toledo, O., base	36.00	35.50	37.00	36.50
Cincinnati, del.	39.50	39.00	....	....
Youngstown, O., base	36.50	36.00	37.00	36.50
Mansfield, O., del.	39.48	38.98	39.98	39.48

† To Neville Island base add: 66c for McKees Rocks, Pa., $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33 Oakmont, Verona; $1.49 Brackenridge.

* Republic Steel Corp., quotes $3 a ton higher at Birmingham, effective Aug. 13; $2.00 higher at Buffalo for No. 2 foundry and malleable and $1.50 higher for basic and $2.75 higher at Cleveland, effective on shipments during week ended Oct. 5.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base) $45.50
6.51-7.00..$46.75 9.01- 9.50. 53.00
7.01-7.50.. 48.00 9.51-10.00. 54.25
7.51-8.00.. 49.25 10.01-10.50. 55.50
8.01-8.50.. 50.50 10.51-11.00. 56.75
8.51-9.00.. 51.75 11.01-11.50. 58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.07-14.50%, $72.50, Jackson, O.; $73.75, Niagara Falls; $78, pigletts, $76, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 16%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$44.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00; Birdsboro, Pa., $45 base; Philadelphia, $44.22, del. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$11.50-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$17.85
Chicago, outside del.	17.50
Chicago, del.	18.50
Terre Haute, del.	18.05
Milwaukee, ovens	18.25
New England, del.	19.50
Birmingham, del.	15.00
Indianapolis, ovens	17.00
Cincinnati, del.	16.50
Ironton, O., ovens	15.50
Painesville, ovens	16.60
Cleveland, del.	17.90
Buffalo, del.	18.25
Detroit, del.	17.65
Philadelphia, ovens	16.75
Swedeland, Pa., ovens	16.75
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	15.75
Pittsburgh, del.	17.61

Coal Chemicals

Spot, gal. freight allowed east of Omaha. Effective as of Apr. 1, 1947.

Pure and 90% benzol	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low-Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	76.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Cres

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$32-$34

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30*	5.30*	5.30	...	...	...	...	...
Shapes, Structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

*Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½"& up	H-R Alloy (8140)	Structural Shapes	Carbon ⅝"-¾"	Floor ⅜" & Thicker
Boston (city)	4.90	5.97[4]	5.67[4]	6.10[4]	7.35[4]	4.97	6.71	4.92	5.57	7.17	4.77	5.05	6.72
††New York (city)	4.87	6.07	5.77[8]	6.07	7.32	4.97	....	4.97	5.52	6.97[9]	4.72	5.02	6.70
New York (country)	4.72	5.92	5.62[8]	5.92	7.17	4.82	....	4.82	....	....	4.57	4.87	6.55
Philadelphia (city)	4.64	6.23[9]	5.83[9]	5.84	7.09	4.73	5.63	4.78	5.48	6.92[9]	4.52	4.79	6.13
Philadelphia (country)	4.54	6.13[9]	5.73[9]	....	....	4.63	5.53	4.68	....	6.82[9]	4.42	4.69	6.03
Baltimore (city)	4.29†	5.85[8]†	5.55[8]†	5.54	6.79	4.70	....	4.75	5.45	....	4.64	4.74	6.20
Baltimore (country)	4.19†	5.75[8]†	5.45[8]†	5.35	6.60	4.60	....	4.65	....	....	4.54	4.64	6.10
Washington (city)	4.75	....	....	....	....	4.95	....	5.00	5.60[13]	....	4.90	4.95	6.60
Washington (country)	4.65	....	....	....	....	4.85	....	4.90	....	....	4.80	4.85	6.50
Norfolk, Va.	4.75	....	....	....	....	....	....	5.05	5.85	....	5.00	5.00	6.75
Memphis, Tenn. (city)	4.77[20]§§	5.79[20]†	....	....	....	4.97[20]	....	4.92[20]	5.79	....	4.92[20]	5.12[20]	6.79[20]
Memphis, Tenn. (country)	4.67[20]§§	5.69[20]†	....	....	....	4.87[20]	....	4.82[20]	5.69	....	4.82[20]	5.02[20]	6.69[20]
Buffalo (city)	4.45	....	5.20[3]	5.95	....	4.65	5.60	4.40	5.10	8.15	4.40	4.85	6.20
Buffalo (country)	4.30	....	5.05[3]	5.50	....	4.20	5.45	4.25	4.95	8.15	4.25	4.40	5.75
Pittsburgh (city)	4.25§§	....	5.10[3]†	5.65	6.90	4.35	5.35	4.40	5.10	10.65	4.40	4.60	5.90
Pittsburgh (country)	4.15§§	....	4.90[3]†	5.50	6.75	4.20	5.20	4.25	4.95	10.50	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[3]	5.638	6.888	4.488	5.35	4.40	5.10	6.908	4.611	4.55	6.111
Cleveland (country)	4.30	5.35[8]	5.05[3]	....	....	....	5.20	4.25	4.95	....	....	4.40	....
Cincinnati (city)	4.671	5.516[8]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Chicago (city)	4.45	5.50[8]	5.20[3]	5.65	6.90	4.35	5.35	4.40	5.10	6.65[13]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[3]	5.50	6.75	4.20	5.20	4.25	4.95	8.15	4.25	4.40	5.75
Milwaukee	4.599	5.649[3]	5.349[3]	5.799	7.049	4.499	5.599	4.549	5.249	6.949[9]	4.549	4.749	6.199
St. Louis	4.749	5.799[9]	5.499[5]	5.974	7.224	4.649	5.774	4.699	5.424[12]	7.124	4.699	4.899	6.349
Birmingham (city)	4.45[20]§§	....	....	5.80	....	4.45[20]	....	4.40[20]	5.93[22]	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
New Orleans	4.98[20]**	....	6.29[18]	....	....	5.18[20]	....	5.13[20]**	6.29[11]	....	5.03[20]**	5.33[20]	7.29[20]
Omaha, Nebr.	5.068	....	....	6.468	7.718	5.168	....	5.218	5.918	....	5.218	5.418	6.868
Seattle, Tacoma, Wash.	5.30[17]	....	7.10[3]	6.70	....	5.60[17]	....	5.30[17]	7.45[10]	8.50[13]	5.25[17]	5.45	7.55[20]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—any quantity; [2]—300 to 1999 lb; [3]—150 to 2249 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—one bundle to 1499 lb; [7]—one to nine bundles; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [10]—450 to 39,999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—400 to 14,999 lb; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999 lb; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Include gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except Indianapolis, Los Angeles, San Francisco, and Pittsburgh where price represents annealed bars; ** add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si.) Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $153, ton lot $165, less ton $172; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.85 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $23.83 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Ferromanganese-Silicon Mix: (Mn 20-25%, Si 47-54%, Fe 25-30%, C 6% max.). Eastern Zone, contract, carload, packed, 20 M x D, 14.25c per lb of alloy, ton lot 15c, less ton 16c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.6c for l.c.l. Freight allowed.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23c, ton lot 23.6c, less ton 24.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add, 0.5c to above prices. Spot, add 0.25c.

Low-Iron Ferromanganese: (Mn 85-90%, Fe 2% max.). Eastern Zone, contract, carload, 2" x D, packed 13.4c per lb of contained Mn, ton lot 14c, less ton 14.6c; Central, add 0.3c for c.l. and 1.10c for l.c.l.; Western, add 0.65c for c.l. and 4.3c for l.c.l. Freight allowed. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17c, ton lot 17.6c, less ton 18.2c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.4c per lb of alloy, carload packed, 7.95c, ton lot 8.45c, less ton 8.95c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 8.8c per lb of contained Si, carload packed 10c, ton lot 10.65c, less ton 11.3c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to above 50% Ferrosilicon prices.

Low-Aluminum 65% Ferrosilicon: (Al 0.50% max.). Eastern Zone, contract, lump bulk 11.55c per lb of contained Si, carload packed 12.6c, ton lot 13.2c, less ton 13.8c; Central, add 0.45c for c.l. and 0.9c for l.c.l.; Western, add 1.4c for c.l. and 5.75c for l.c.l. Freight allowed. Spot, add 0.35c.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.2c per lb of contained Si, carload packed 12.25c, ton lot 12.85c, less ton 13.45c; Central, add 0.3c for c.l. and 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

Low-Aluminum 75% Ferrosilicon: (Al 0.50% max.). Add 0.75c to above 75% Ferrosilicon prices.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 12.7c per lb of contained Si, carload packed 13.7c, ton lot 14.25c, less ton, 14.8c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 85% Ferrosilicon prices.

90-95% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 14.35c per lb of contained Si, carload packed 15.35c, ton lot 15.85c, less ton 16.35c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.65c to above 90-95% Ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, carload, lump, bulk, regular, 16.5c per lb of Si, carload packed 17.5c ton lot 18c, less ton 18.5c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb carlots 6.50c; ton lots packed, 7c; 200 to 1999 lb, 7.75c; smaller lots, 8.25c. Spot up 0.5c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, carload, lump, bulk 17.6c per lb of contained Cr, carload, packed 18.2c, ton lot 18.8c, less ton 19.5c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Special Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, carload, 8MxD, bulk 19.1c per lb of contained Cr, carload, packed 19.7c, ton lot 20.4c, less ton 21.35c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 27c per lb of contained Cr, 0.04% C 26c, 0.05% C 25.5c, 0.06% C 25c, 0.10% C 24.5c, 0.15% C 24.0c, 0.20% C 23.75c, 0.15% C 23.5c, 1% C 23.0c, 2% C 22.5c. Carload packed add 0.8c, ton lot add 1.35c, less ton add 2.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"8M" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, and C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 23c per lb of contained chromium, carload, packed 23.8c, ton lot 24.35c, less ton 25.35c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe.). Eastern Zone, contract, carload, 1" x D, bulk, max. 0.50% C grade, 0.87c per lb of contained chromium, carload packed 0.88c, ton lot 89.5c, less ton 91.5c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 11.1c per lb of briquet, carload packed 11.6c, ton lot 12c, less ton 12.4c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8c per lb of briquet, c.l. packed, 8.6c, ton lot 9c, less ton 9.4c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, carload, bulk 9.65c per lb of briquet, c.l. packed 10.25c, ton lot 10.65c, less ton 9.05c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l., freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (**Large size**—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 4.65c per lb of briquet, c.l. packed 5.25c, ton lot 5.65c, less ton 6.05c. (**Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 4.8c, c.l. packed 5.4c, ton lot 5.8c, less ton 6.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium Metal: Eastern Zone, contract, Cast Form, ton lot $1.85 per lb of metal, 100 to 1999 lb $2.20, less than 100 lb $3.40; Turnings, $2.70, $3.05, $5.00; Distilled, $3.40, $4.20, $6.20. Central, add 2c; Western, add 4c. Freight allowed. Spot, add 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 16.75c per lb of alloy, carload packed 17.35c, ton lot 18.85c, less ton 19.85c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 15.5c per lb of alloy, carload packed 16.5c, ton lot 18c, less ton 19c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Manganese-Nickel-Titanium: (Ti 43-48%, Mn 8% max., Ni 20% approx., Fe 5% max., Al 18% max., C 0.15% approx., Si 2% approx.). Eastern Zone, contract, ton lot, 2" x D, $2.25 per lb of contained titanium, less ton $2.50; Central, add 3c; Western, add 10c. Freight allowed. Spot, add 10c.

Silicon-Titanium: (Ti 40-45%, Si 45-50%, Fe 3% max.). Eastern Zone, contract, ton lot, 2" x D, $1 per lb of contained Ti, less ton $1.10; Central, add 2.9c; Western, add 10.5c. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.50 per lb of contained W; 2000 lb W to 10,000 lb W, $2.60; less than 2000 lb W, $2.72. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $3.05 per lb of contained W; less than 1000 lb W, $3.15.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, carload, lump, bulk 6c per lb of alloy, carload packed 6.55c, ton lot 6.9c, less ton 7.25c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western, add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Nickel-Zirconium: (Ni 40-45%, Zr 25-30%, Al 15% approx., Si 10% max., Fe 5% max.). Eastern Zone, contract, ton lot, 1" x D, $3.55 per lb of zirconium contained in the alloy, less ton $3.75; Central, add 4.6c; Western, add 16.3c. Freight allowed. Spot, add 10c.

Development of New Metal Deposits Urged

Interior Secretary Krug advises striving for more self-sufficiency in copper, lead, zinc and other strategic and critical minerals

NEW YORK — Reserves of copper have been substantially increased as a result of the Bureau of Mines' investigation of Arizona's San Manuel deposit of ore containing 0.8 per cent copper, according to Secretary of the Interior J. A. Krug. Drilling by the bureau in 1943-1945 indicated the existence of 30 million tons of ore and further drilling by San Manuel Copper Corp., subsidiary of the Magma Copper Co., New York, has increased the estimate by about 14 times the original figure. Plans are under way by this company to begin the development of the ore body which represents the largest addition to copper reserves in recent years.

"As long as we are dependent on foreign sources for a substantial share, now amounting to about one-third of our domestic needs," Secretary Krug said, "we must do all we can to approach self-sufficiency not only in copper but in zinc, lead and other strategic and critical minerals. Further exploration of known reserves, investigation of potential new reserves . . . must be carried on and intensified."

COPPER — Although large-scale commercial production is planned at San Manuel property, this project does not remove copper from the strategic and critical list of the Army-Navy Munitions Board. Reserves were recently estimated by the company at 425 million tons of ore. With an 80 per cent recovery from ore containing 0.8 per cent copper, this tonnage could yield about 2,720,000 tons of pure metallic copper. This is roughly equal to little more than 2 1/2-year supply of copper at the wartime rate of production of 1 million tons annually from domestic resources. Together with the recently-announced plans of the Anaconda Copper Co. to mine 130 million tons of 1 per cent copper-bearing ore at Butte, Mont., enough copper has thus been added to reserves to last more than three years at the current annual rate of consumption.

Products shipped by makers of copper and brass products during August contained 96,484 tons of refined copper, gain of 9317 tons over the total for July which was the low month so far this year. Consumption of copper during September showed a moderate increase over August. Demand for copper for fourth quarter shipment has increased.

Members of the industry claim there is a potentially large foreign demand for copper but the lack of dollars abroad still is a deterrent to any sharp gain in actual purchases.

COPPER WIRE — Effective as of Oct. 1, Anaconda Wire & Cable Co. reduced the base price for bare copper wire 80 points, making the new price 27.42c a pound for less than carload lots. The base price for weatherproof wire was reduced 52 points to 28.10c a pound for less than carload lots. No change was made in company's price for magnet wire which remains at 30.50c a pound for less than carload lots.

LEAD—Sellers opened November books last week and had no difficulty in selling daily quotas. Users are expected to receive a slightly larger tonnage in the fourth quarter than in the period just closed.

ZINC — Trading in the domestic market continued quiet last week with prices unchanged on the basis of 10.50c, East St. Louis, for prime western.

TIN — Reconstruction Finance Corp. has purchased 2000 additional tons of the tin which was recovered in Japan and which reached this country last year. This leaves only about 1800 tons of some 10,000 tons which came from Japan still to be allocated. Under direction of RFC, the Tin Sales Corp. started to issue contracts last week against the tin allocations for October.

PLATINUM — Price of platinum eased $3 an ounce last week to the basis of $59, wholesale, and $62, retail.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 17.50c-18.00c; 88-10-2 (No. 215) 25.75-26.25c; 80-10-10 (No. 305) 21.50-22.00c; No. 1 yellow (No. 405) 13.75-14.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.00-14.50c; No. 12 foundry alloy (No. 2 grade) 13.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 12.75c; grade 3 (90-92%) 12.00-12.25c; grade 4 (85-90%) 11.50-11.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-9999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $81-$84 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $17 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg); $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 71.37½c, per ounce.

Platinum: $59-$62 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c-27.72c, less carlots 27.42c-28.22c; weatherproof, fob eastern mills carlots 27.60c-28.12c, less carlots 28.10c-28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers; in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.00, No. 2 copper 15.50-16.00, light copper 14.50-15.00, composition red brass 12.75-13.00, auto radiators 9.75, heavy yellow brass 9.00, brass pipe 10.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.00-18.25, No. 2 copper 16.50-16.75, light copper, 15.50-15.75, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 13.125.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.00, No. 2 15.00-15.25, light copper 14.00, No. 1 composition red brass 11.00-11.50, No. 1 composition turnings 10.50-11.00, mixed brass turnings 6.00-6.50, new brass clippings nom. 10.50-11.00, No. 1 brass rod turnings 9.00-9.50, light brass 5.50-6.00, heavy yellow brass 6.50-7.00, new brass rod ends 9.00-9.50, auto radiators, unsweated 8.50-9.00, cocks and faucets 8.00-8.50, brass pipe 8.00.

Lead: Heavy 11.50, battery plates 6.50-6.75, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 10.75-11.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00, new die cast scrap 3.50-4.00, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S 8.00-8.50, old sheets 6.00-6.50, crankcases 6.00-6.50, borings and turnings 2.00-2.50, pistons, free of struts, 5.00-5.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1, 2 and 3 Bundles	38.00
Machine Shop Turnings	32.50-33.00
Mixed Borings, Turnings	32.50-33.00
Short Shovel Turnings.	34.50-35.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	45.50-46.00
Low Phos. Steel	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Cut Structurals	44.50-45.50
Elec. Furnace Bundles.	43.50-44.50
Heavy Turnings	36.50-37.50

Cast Iron Grades

No. 1 Cupola	43.00-43.50
Charging Box Cast	40.00-40.50
Heavy Breakable Cast.	36.50-37.50
Stove Plate	34.50-35.50
Unstripped Motor Blocks	38.00-39.00
Malleable	49.50-50.50
Brake Shoes	35.00-36.00
Clean Auto Cast	40.00-41.00
No. 1 Wheels	42.00-42.50
Burnt Cast	32.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.50-42.00
R.R. Malleable	50.00-51.00
Axles	42.00-43.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	43.00-44.00
Rails, 3 ft and under	46.00-47.00
Rails, 18 in. and under	47.00-48.00
Railroad Specialties	47.50-48.00
Uncut Tires	46.00-46.50
Angles, Splice Bars	45.00-46.00

CLEVELAND

No. 1 Heavy Melt. Steel	$38.00-38.50
Nd. 2 Heavy Melt. Steel	38.00-38.50
No. 1 Busheling	38.00-38.50
Nos. 1 & 2 Bundles	38.00-38.50
Machine Shop Turnings	33.00-33.50
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings.	33.50-34.00
Cast Iron Borings	33.50-34.00
Bar Crops and Plate	41.00-41.50
Punchings & Plate Scrap	41.00-41.50
Heavy Turnings	37.00-37.50
Alloy Free Turnings	34.00-34.50
Cut Structurals	41.00-44.00

Cast Iron Grades

No. 1 Cupola	46.50-47.50
Charging Box Cast	43.50-44.50
Stove Plate	43.00-43.50
Heavy Breakable Cast.	41.00
Unstripped Motor Blocks	41.00
Malleable	57.00-60.00
Brake Shoes	42.00
Clean Auto Cast	48.00-50.00
No. 1 Wheels	44.00
Burnt Cast	41.00-41.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	57.00-60.00
Rails, Rerolling	50.00
Rails, Random Lengths	46.00-47.00
Rails, 3 ft and under	48.00-50.00
Cast Steel	48.00-48.50
Railroad Specialties	48.00-48.50
Uncut Tires	43.00-43.50
Angles, Splice Bars	48.00-50.00

VALLEY

No. 1 Heavy Melt. Steel	$40.00-41.00
No. 2 Heavy Melt. Steel	39.00-40.00
No. 1 Bundles	39.00-40.00
Machine Shop Turnings	34.00-35.00
Short Shovel Turnings.	34.00-35.00
Cast Iron Borings	34.00-35.00
Low Phos.	44.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.00

MANSFIELD

No. 1 Heavy Melt. Steel	$38.00-40.00
Machine Shop Turnings	35.00
Short Shovel Turnings.	36.00-37.00

CINCINNATI

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
No. 1 Bundles	37.00
No. 2 Bundles	37.00
Machine Shop Turnings	31.00
Mixed Borings, Turnings	30.00
Short Shovel Turnings.	33.00
Cast Iron Borings	32.00

Cast Iron Grades

No. 1 Cupola Cast	47.00
Charging Box Cast	41.00
Heavy Breakable Cast.	40.00
Stove Plate	38.00
Unstripped Motor Blocks	38.00
Brake Shoes	35.00
Clean Auto Cast	46.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00
R.R. Malleable	57.00
Rails, Rerolling	46.00
Rails, Random Lengths	44.00
Rails, 18 in. and under	50.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	27.50-28.00
Mixed Borings, Turnings	27.50-28.00
Short Shovel Turnings.	28.50-29.00
Cast Iron Borings	28.50-29.00
Punchings & Plate Scrap	39.50-40.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-40.00
Heavy Breakable Cast.	33.00-34.00
Clean Auto Cast	39.00-40.00

BUFFALO

No. 1 Heavy Melt. Steel	$39.00-40.00
No. 2 Heavy Melt. Steel	37.00-38.00
No. 1 Busheling	37.00-38.00
No. 1 & 2 Bundles	37.00-38.00
Machine Shop Turnings	30.50-31.50
Mixed Borings, Turnings	30.50-31.50
Cast Iron Borings	30.50-31.50
Short Shovel Turnings.	31.50-32.50
Low Phos	42.00-43.00
Elec. Furnace Bundles.	39.50-40.50

Cast Iron Grades

No. 1 Cupola Cast	40.00-41.00
Heavy Breakable Cast.	35.00-36.00
Malleable	48.00-50.00
No. 1 Wheels	41.00-42.00

Railroad Scrap

Rails, 3 ft and under	45.00-46.00
Railroad Specialties	46.00-47.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
No. 1 Bundles	37.00
No. 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	30.50-31.50
Mixed Borings, Turnings	30.50-31.50
Short Shovel Turnings.	30.50-31.50
Bar Crop and Plate	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Cut Structurals	43.00-44.00
Elec. Furnace Bundles.	41.00-42.00
Heavy Turnings	39.00-40.00
No. 1 Chemical Borings	35.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	46.00-48.50
Charging Box Cast	46.00-47.00
Heavy Breakable Cast.	46.00-47.00
Unstripped Motor Blocks	42.50-43.50
Malleable	57.00-58.00
Clean Auto Cast	47.50-48.50
No. 1 Wheels	47.00-48.00

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$32.00
No. 2 Heavy Melt. Steel	32.00
No. 1 Busheling	32.00
Nos. 1 & 2 Bundles	32.00
No. 3 Bundles	31.00
Machine Shop Turnings	26.00-26.50
Mixed Borings, Turnings	27.00-27.50
Short Shovel Turnings.	28.00-28.50
Punchings & Plate Scrap	34.00-35.00
Cut Structurals	34.00-35.00
Elec. Furnace Bundles.	33.00
No. 1 Chemical Borings	24.50-25.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	38.00-38.50
Heavy Breakable	38.00-38.50
Unstripped Motor Blocks	36.00-37.00
Malleable	54.00-55.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	31.00-32.00
Nos. 1 & 2 Bundles	31.00-32.00
No. 1 Busheling	31.00-32.00
Machine Shop Turnings	24.50-25.50
Mixed Borings, Turnings	26.00-26.50
Short Shovel Turnings.	26.50-27.50
Bar Crops and Plate	33.00-34.00
Punchings & Plate Scrap	33.00-34.00
Chemical Borings	27.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast.	38.00-39.00
Stove Plate	37.00-38.00
Unstripped Motor Blocks	35.00-36.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$38.50-39.00
No. 2 Heavy Melt. Steel	38.50-39.00
Nos. 1 & 2 Bundles	38.50-39.00
No. 3 Bundles	36.50-37.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	41.00-41.50
Cast Steel	41.00-41.50
Punchings	41.00-41.50
Elec. Furnace Bundles.	39.50-40.00
Heavy Turnings	38.00-38.50
Cut Structurals	41.50-42.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Malleable	42.00-45.00
Clean Auto Cast	42.00-45.00
No. 1 Wheels	42.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-40.50
Rails, Rerolling	46.00-46.50
Rails, Random Lengths	41.50-42.00
Rails, 3 ft and under.	44.00-44.50
Rails, 18 in. and under	44.50-45.00
Railroad Specialties	43.00-43.50
Angles, Splice Bars	43.00-43.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	38.50-39.50
Machine Shop Turnings	32.00-33.00
Short Shovel Turnings.	34.00-35.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	42.00-43.00
Charging Box Cast	39.00-40.00
Heavy Breakable Cast.	35.00-36.00
Brake Shoes	37.00-38.00
Clean Auto Cast	42.00-43.00
Burnt Cast	35.00-37.00

Railroad Scrap

R.R. Malleable	54.00-55.00
Rails, Rerolling	45.00-46.00
Rails, Random Lengths	42.00-43.00
Rails, 3 ft and under	45.00-46.00
Uncut Tires	43.50-44.50
Angles, Splice Bars	43.00-44.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$34.00-35.00
No. 2 Heavy Melt. Steel	34.00-35.00
No. 1 Busheling	34.00-35.00
Nos. 1 & 2 Bundles	34.00-35.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	41.00
Stove Plate	39.00
No. 1 Wheels	36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	42.50
Axles, Steel	39.00
Rails, Rerolling	41.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars.	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$22.00
No. 2 Heavy Melt. Steel	*22.00
No. 1 Busheling	*22.00
Nos. 1 & 2 Bundles	*22.00
No. 3 Bundles	*17.00
Machine Shop Turnings	*12.50
Bar Crops and Plate	22.00
Cast Steel	22.00
Alloy Free Turnings	12.50
Cut Structurals	22.00
Tin Can Bundles	17.00

Railroad Scrap

Axles	29.00
Rails, Random Lengths	23.50
Uncut Tires	30.50

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	22.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	20.00
Machine Shop Turnings	13.50
Mixed Borings, Turnings	13.50
Punchings & Plate Scrap	23.50
Cut Structurals	23.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$22.50
No. 2 Heavy Melt. Steel	22.50
Nos. 1 & 2 Bundles	22.50
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

Sheets, Strip . . .

Carnegie-Illinois issues new extra cards on hot-rolled carbon strip

Sheet Prices, Page 218

Pittsburgh — Carnegie-Illinois Steel Corp. issued a new extra card on hot-rolled carbon strip, dated Oct. 3, incorporating the following revisions: Pickling extras for widths one inch and under have been revised upward to the level in effect prior to last revision early this year. The new schedule incorporates advances of 25 cents per 100 lb in thickness range 0.2030 to 0.1121-in.; 35 cents, under 0.1121 to 0.0636-in.; 50 cents, under 0.0636 to 0.0344-in.; and $1, under 0.0344 to 0.0255-in. There is no processing extra for standard-coil weights, but for these a note to the effect "on application" has been included in the listing of the processing extras. The extensometer test extra of $10 per test has been replaced by an extra of 10 cents per 100 lb. Minor revisions also have been made in the carbon and silicon chemical requirement extras. Packaging extras have been simplified, involving some increases and deductions with little net change.

Of significant interest to the trade was recent announcement of Detroit Steel Corp. to decentralize its operations. This company has let contracts for construction of a cold-rolled strip mill at New Haven, Conn. United Engineering & Foundry Co. will furnish the four-high reversing mill and auxiliary equipment scheduled to be in operation by Oct. 1, 1948.

Boston — Demand and consumption of narrow cold strip is heavier. Increase in new orders is due in part to opening of some books for first quarter. Production schedules are hampered by lack of balance in hot-rolled inventories, notably low carbon, and output in those grades is down. Annealing is also a bottleneck at some mills with slitting and spot rolling capacity open as a result. While more producers have adopted a more uniform extra card, the price spread continues on the Worcester base. Sheet mill carryovers have cut into allocations for fourth quarter although there is slight easing in electrical grades.

New York — While the flow of sheets should continue at a high rate in the fourth quarter, much of the tonnage which consumers will receive will be against orders accepted for delivery in previous periods. Some producers have advised their customers that less than a month's production in the current quarter will be applied to new quotas.

Chicago — Sheet and stripmakers report no lessening in demand for flat-rolled products and, while they are producing and shipping up to the limit of steel quotas assigned to these products, are unable to dent backlogs. It is estimated that year-end carryover will be highest in history, possibly as much as three months on some products. In the meantime, mills prefer not to adjust fourth quarter customer quotas but to ship all they can against them. It is a foregone conclusion that 1948 quotas will undergo drastic revision.

Cincinnati — District mills are holding fast to an established policy of making up schedules and allotments quarter by quarter. Despite pressure, the mills now, as a new quarter opens, are adverse to pledging commitments past the first of the year. Demands in all phases fail to expose any rift in the tight supply situation. Requirements for housing in the current quarter have not diminished in the degree anticipated and mills are keeping close to former quotas for these purposes.

Birmingham — Despite unprecedented high steel production of 99 per cent in this district, not much progress is being made in reducing sheet order backlogs. Demand in some quarters is stronger than during the war and much pressure is being exerted, usually to little or no avail, for more tonnage and faster deliveries. So far there has been no announcement of 1948 quotas.

St. Louis — Sheet demand has risen so sharply local rolling mills have virtually abandoned plans to reopen order books this year; certainy not before Nov. 15. They still expect to be current by Jan. 1, but prefer to take no chances on a carryover until they are sure they can cover present commitments by the yearend. With rare exceptions, their books have been closed all year. Sheet production continues to gain gradually, due in part to larger scrap supplies. Improved shipments have allowed ground stock accumulations, which now average 40 to 60 days' needs. Stronger local demand for sheets is attributed to eastern mills' curtailment of allotments to their warehouses in this district. Completion of a new cold rolling mill, formerly scheduled for this month, has been delayed again to November. Demand in all flat-rolled products will require full capacity operations for two years in this area, according to trade forecasts.

Plates . . .

Plate Prices, Page 219

Philadelphia—Plate consumers continue to fairly swamp producers with inquiry, much of which is being turned down. Producers generally have not opened their books for the first quarter and already have substantially more tonnage on their books than they can supply in the current quarter. Demand for light plates is encountering particular difficulty.

Pittsburgh — Sellers contend plate supplies are just as tight as those of sheets and strip. Postwar demand has held up remarkably well, with bulk of tonnage going into augmentetd freight car construction, fabrication of storage tanks, heavy machinery, barges and large diameter pipe. Some sellers plan to block out part of November and all of December rolling schedules in effort to clear up carryover tonnages (which range from 4 to 6 weeks) by yearend. This was expected by many fabricators, but doesn't help matters much at this late date for many of their contracts were based on tentative assurance of a specific tonnage of steel to be received from the mills prior to bidding on new work. Overall mill shipments to date this year represent peacetime record volume, but still fall far short of meeting essential needs of many fabricators.

Birmingham — Increased car production, together with accelerated activity by tank manufacturers, keeps the plate situation in this district as tight as ever. Even with increased allocations to the car building industry by local mills, considerable plate tonnage for that purpose is moving here from outside mills. The overall demand continues high.

Seattle — Largest plate tonnage pending is for the McNary Dam cofferdam on the Columbia river, bids to U. S. engineer, Portland, Oct. 20. This project involves a total of 3630 tons, 1800 tons of straight web steel sheet piling, and 300 tons of Tee section in place; also, 1300 tons and 230 tons, respectively, in stockpiles. No other projects involving sizable tonnages of plates are pending. Shops report a fair run of business in small tonnages for tanks and miscellaneous jobs.

Detroit Steel Corp. Plans New Cold-Rolled Strip Mill

New Haven, Conn. — Detroit Steel Corp. will build a cold-rolled strip mill here, having a capacity of 60,000 tons a year. The mill will have a rolling range up to 3/16-inch in thickness and up to 22 inches in width, in coils or cut lengths, up to 0.80 carbon. Equipment will include pickling, annealing, rolling, slitting and edging installations. Operation of the plant is scheduled to start by October, 1948.

British Steel Prices Rise 15s to £1 3s 6d Per Ton

London — Ministry of Supply announced increases of 5 to 6 per cent in British steel prices, effective as of Oct. 1. Over 100 changes were made in price schedules for iron and steel products. Steel billets were increased by 15s a ton ($3.03); heavy steel products, 18s 6d ($3.73); and steel sheets, £1 3s 6d ($4.74) a ton. Increases were attributed to the recent rise in freight rates and to higher coal and coke costs.

Canadian Steel Prices Rise $2.50 to $10 Per Ton

Ottawa, Ont. — Prices Board here announced increases of $2.50 a ton for pig iron; $5 to $7 a ton on steel billets, bars and rods; and $7 to $10 a ton on varying types of steel sheets, effective as of Oct. 1.

The board attributed the increases to "accumulate costs" incurred since an average increase of $5 a ton was granted Apr. 1, 1946. Since that time, United States prices have been decontrolled and all raw materials from the United States have increased substantially in price. Canadian raw materials also have been decontrolled gradually and steel companies have been required to absorb these increased costs. In addition, a st scrap price increase of $5 a ton, granted during the week ended Sept. 27, is reflected as a direct increase to the steel mills.

Tubular Goods . . .

Tubular Goods Prices, Page 219

Pittsburgh — Demand-supply relationship in standard pipe items shows no improvement and there is little prospect of this occurring for months to come. Output continues limited to steel available for pipe production, which means the production trend will be dependent to some extent on pressure for delivery of other steel items. Output of drill pipe is coming into much closer balance with demand than was the case earlier this year. The same situation is developing in alloy tubing and stainless, in fact in some instances these items are readily available from stock. Critical pig iron shortage is major factor for limited cast iron pipe output. Cast pipe producers have not been able to make much headway against order backlogs, with deliveries extended 15 to 18 months in smaller size classifications.

Philadelphia—Stringency in pipe is perhaps second only to light flat-rolled products, with no early improvement in supply in sight. The situation in line pipe is particularly critical, with fabricators booked many months ahead. A recent West Coast inquiry calls for 45,000 tons, for which plates are being sought from eastern mills for delivery during the first three months of next year. The project is identified as the Second East Bay Municipal Utility pipeline.

Seattle — No important cast iron pipe projects are pending here, many jobs having been deferred until better deliveries can be guaranteed. Considerable pipe is afloat on intercoastal vessels which have been tied up by labor troubles. The city of Seattle is buying in advance and follows the procedure of asking for improvement bids about 30 days in advance of the arrival of shipments which are resold to contractors.

Structural Shapes . . .

Structural Shape Prices, Page 219

Philadelphia — Structural demand here is featured by an inquiry for 1700 tons for a warehouse for the Armstrong Cork Co., Lancaster, Pa., with bids to be closed Oct. 15, and the award of 2300 tons for an experimental station for E. I. du Pont de Nemours & Co., Wilmington, Del., to Bethlehem Fabricators Inc., Bethlehem, Pa.

A company recently organized as the Pencoyd Structural Steel Co., this city, has purchased 15,000 tons of mild steel billets which it will have converted into shapes by an eastern mill for sale at 6.50c a pound, fob cars, Philadelphia.

Pittsburgh — An increasing number of instances are noted wherein bids exceed money appropriated for expansion programs, reflecting steadily rising construction costs. This situation has resulted in the shelving of many municipal projects for an indefinite period and has delayed a number of important industrial expansion and modernization programs. Mills are entering final quarter this year with a 3 to 4 week carryover due to a number of interruptions to production schedules. Sellers are blocking out most of December rolling schedules so they can be on a current basis by yearend. Fabricators report steady volume of new business. Little inroad has been made in order backlogs due primarily to scarcity of structurals, notably among the lighter sections.

Birmingham — Shape supply continues unpredictable in this section. Overall demand is very good, but tonnage is composed chiefly of small individual lots. Inquiries are much more numerous than actual orders as prospective builders shy away from the generally upset construction situation.

Seattle—Fabricating plate plants report a sizable volume of small commercial and industrial jobs. Contracts are being taken only in line with supplies, which continue inadequate. Mills' allocations are slow in arriving due to interruption of water services and consignments for rush jobs are coming by rail.

Steel Bars . . .

Decline in demand for alloy, cold-finished bars spreading slowly to hot-rolled carbon

Bar Prices, Page 218

Boston — Easing in cold-finished carbon bar demand has not as yet been a contributing factor to any extent toward better supply of hot-rolled. Carryovers are heaviest in smaller sizes, but most producers made progress against backlogs last quarter and the volume of delinquent tonnage is less in a smaller range of sizes. Consumer inventories of bars have become better balanced in most grades. Fourth quarter quotas on hot-rolled carbon stock about equal last quarter's, but more suppliers of cold-finished are withdrawing allocation of cold-drawn.

New York — Hot carbon bar consumers look for current quarter quotas to be about on a parity with those for third quarter, but estimate they will not receive as much tonnage as they can consume. This is especially true with respect to small sizes of both flats and rounds, which continue in stringent supply. Easing in cold-drawn carbon bar demand may be reflected in the supply of hot-rolled bars before the year is over, but consumers are not counting too much on it. Alloy bars can be had for delivery within four to five weeks.

Philadelphia — While some buyers are able to get large rounds and flats ex-quota, they are having difficulty in getting anywhere near as much tonnage as they could use in the smaller sizes of hot-rolled carbon bars. In general, fourth quarter quotas are about the same as for the past quarter, but there is nothing to be had beyond in the medium and smaller sizes, which continue in excessive demand. Such new capacity as has been brought in this year is requiring an unexpectedly long time to get into regular production. Eventually, this will be accomplished and with continued lag in cold-drawn bar demand, an easing in hot carbon bar supply should develop.

Pittsburgh — Pressure for carbon bar deliveries is showing signs of easing, even for the smaller size classifications. Definite decline in demand for alloys and from cold finishers has made it possible for carbon bar producers to make some headway against order backlogs. Interruptions to rolling mill schedules to date this year have resulted in a carbon bar carryover tonnage equal to about 2 weeks' output. In case of Carnegie-Illinois Steel Corp., this carryover tonnage represents closer to 3 weeks' output for smaller sizes. Most sellers are not scheduling new orders for part of December in an effort to clear up their carryover tonnage by yearend. New demand for cold-finished carbon and alloy bars continues well below that recorded earlier this year, reflecting inventory adjustment on part of customers and fact new orders now represent tonnage for stock replacement rather than for building up inventory pipe lines.

Wire . . .

Wire Prices, Page 219

Chicago — Demand for wire and wire products holds at a level in excess of production. Shipments and order backlogs are of sizable proportions. Some increase is noted in wire rope orders and a heavier volume is in prospect. Building and paving requirements for welded mesh are heavy. Some slowness has developed for pipe mesh, but prospects for next spring are exceedingly bright.

Birmingham — Demand for wire will remain heavy as long as current weather conditions continue. A great part of this district's demand comes from agricultural sources which will slacken off somewhat with advent of colder weather. Needs of wire processors, however, is great and demand for baling wire generally exceeds available supplies.

Iron Ore . . .

Iron Ore Prices, Page 220

Cleveland — Shipments of Lake Superior iron ore declined further during the week ended Sept. 29 to 2,306,162 tons compared with 2,448,339 for the preceding week, but 308,782 tons larger than the total for the corresponding 1946 period, according to the Lake Superior Iron Ore Association, this city. United States ports accounted for 2,249,691 tons of the total, or a daily loading average of 321,384 tons.

Cumulative shipments for the season to Sept. 29 came to 61,039,548 tons, compared with 42,560,204 tons for the like 1946 period. United States ports accounted for 59,791,070 tons of this year's total, or an increase of 18,147,773 tons over the total for the like period a year ago. All ports in this country have reported larger shipments than they did a year ago.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 219

Cleveland — With few exceptions, producers raised prices on most bolt, nut and rivet items on Oct. 1, and at the same time all who had quoted firm prices throughout last quarter reverted to their prior practice of selling on the basis of prices in effect at time of shipment. Price revisions have not yet been completely figured by all interests, however, but indications point to ultimate conformity

with the prices now established by the leading producers.

Pittsburgh — Fastener manufacturers raised prices Oct. 1 an average of 6 per cent on bolts and 9 per cent on nuts. The new pricing policy has been revised from that of establishing prices on a quarterly basis to the basis of prices in effect at time of shipment. Since termination of OPA, the industry advanced prices about 12 per cent on Dec. 16, 1946, and an estimated average of 7 per cent on June 11. (See page 219 for new discount schedules.)

Output of fasteners, notably in small size classifications of 3/8 to 5/16-inch, continues to be retarded by scarcity of wire. Some interests note a slight falling off in demand.

Pig Iron . . .

Pig iron output still fails to meet demand, forcing some foundries to curtail

Pig Iron Prices, Page 220

Pittsburgh — Merchant pig iron output here continues well below essential needs of most foundries, a situation that has been aggravated by policy of blast furnace interests outside this district not to continue to serve old customers here because of the substantial increase in their own integrated requirements and the sharply augmented merchant iron demand within relatively short radius of their furnaces. A number of foundries here have been forced to shut down completely for intervals as much as a week at a time due to depleted pig iron stocks. The foundry coke supply, while below prewar quality, is adequate at the moment, and there is no indication this condition will be significantly altered through the winter months. While no definite trend has as yet developed, there are signs of easing in demand for gray iron castings, as reflected in reduction in order backlogs in some instances.

Philadelphia — Several district foundries are planning to close down this month for a week to two weeks because of the shortage of pig iron, with some taking the occasion to make needed repairs. However, various foundries figure they will be able to carry on without interruption for a while, especially in view of the outlook for improved supply of oven foundry coke. Suspension of operations at the larger stack at Swedeland, Pa., has made available a substantial increase in the supply of this coke, and a number of foundrymen believe that with this coke, and through increased consumption of cast scrap and ferroalloys, they can keep going for the time being at fairly well sustained operating rates. Meanwhile, consumers of basic iron are feeling the effects of the increasing shortage of iron, with production off slightly as a result.

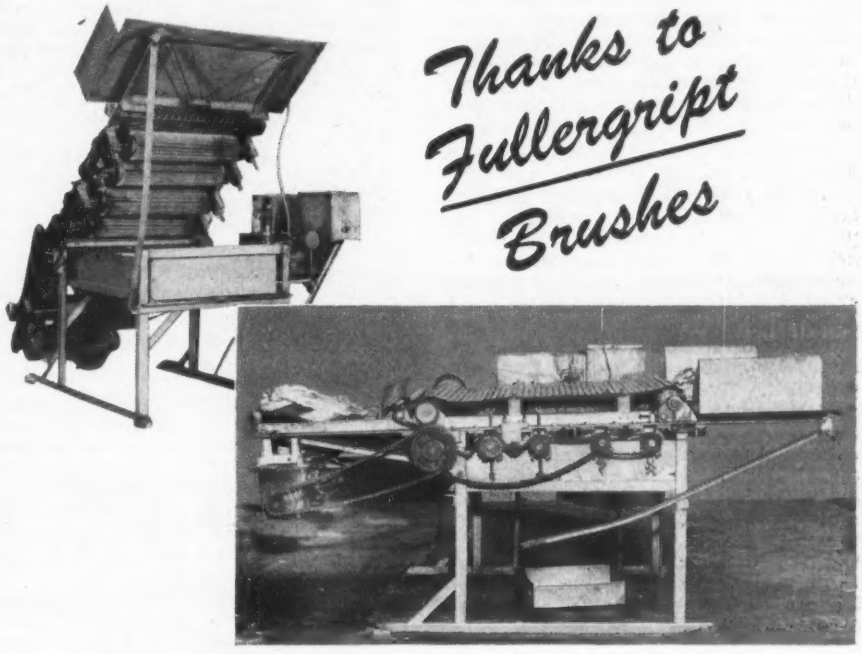
New York — Local pig iron consumers doubt they will be uble to maintain their daily rate of operation this month at even the average level held in September, because of the further stringency in pig iron. Some consumers figure they will probably have to suspend operations entirely for limited periods until pig iron supply improves.

Boston — Pig iron supply with large melters has improved to the point where a lower ratio of scrap in melts is possible and inventories range from one to two months. While this is a low level for prewinter reserves, pressure for tonnage is less sharp, although supply is still critical with smaller foundries. There is also a slight decline in overall melt but more in relation to scrap than to pig iron.

Chicago — Although pig iron is being produced in this district at an all-time high volume with 41 of 42 blast furnaces operating, a larger than normal percentage of the product is going into hot metal for steelmaking. This leaves iron for foundries as tight as ever and the pressure for shipments is heavy. In some instances, coke also is a difficult item for foundries. Thus, under the continued conditions of raw material shortages, foundries are unable to make progress in reducing their order backlogs for castings.

Buffalo — Despite a general easement in operations among small and medium sized foundries, the pig iron market is tighter than ever as ingot makers absorb the bulk of current output.

Buyers of castings express surprise over price-shaving activities. A consumer reported gray iron castings have been slashed in one instance from 15 to 9 cents a pound. This in no way reflects the price and supply situation in merchant iron. No merchant iron price changes are likely this month. With ingot makers taking increased tonnage producers are still finding it



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This machine now eliminates ¾ labor cost — assures uniform product — when carroting fur used in men's hats.

This endless-conveyor type of carroting machine was developed by the Lockwood Fur Company with the cooperation of Fuller engineers. They devised some brushes with an action carrying acid deep into the fur, and other brushes removing the correct amount of excess acid. All these brushes were finally developed with Fullergript strips using an acid-resisting brush material anchored in a stainless steel backbone—which increased brush life from the original 2 days to the present 9 *months*. The machine carrots 20,000 pelts in an eight hour day at a cost ¼ that formerly paid a crew of hand workmen.

Fuller engineers could help you in developing special machinery of similar effectiveness in your own industry. It will pay you to write to . . .

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difficult to cover all melters. No improvement is scheduled this month in tonnage for New England consumers. The merchant stack that was banked for lack of coke three weeks ago is still out of production.

Cincinnati — Shipments of pig iron into this district are holding at recent levels which fail to meet insistent demands of melters. Furnace interests report they can not foresee, in the immediate future, any possibility for larger tonnages. Chances are the melt for the second half will be considerably below that of the first six months when furnace allotments were more liberal.

Birmingham — The pig iron situation tightens gradually but surely. Indications last week were that the district's need for iron will not decline materially, even with a leveling of demand generally, since several new users have located in the southern states, and since the district is producing a variety of war-born items not produced here in prewar days. Much anxiety is expressed over adequacy of future supplies.

Seattle—Foundry business in this area has declined 40 to 50 per cent from the war peak. Present activity is spotty, some plants running to capacity, others in need of work. It is a sellers' market with competition for new business keen. Coke and pig are short, the latter accentuated by a recent breakdown at the Geneva plant. This situation has sharpened the demand for cast iron which is none too plentiful. Overall foundry operations are higher than prior to the war as new industries have located here and expanded processes, especially in light metals, have stimulated activity. The labor situation is unfavorable, an instance being cited of a sizable plant moving from Seattle to Los Angeles, the owner figuring he can ship from California to this area cheaper than he can produce here under existing labor conditions.

Ferroalloys . . .

Ferroalloy Prices, Page 221

New York — Effective Oct. 1, leading sellers generally are quoting standard grade ferromanganese, 78 to 82 per cent, in carlots, duty paid, at $145 fob cars Baltimore, Philadelphia or New York, whichever is the most favorable to the buyer. One large seller originally announced a price of $150, but has since revised this figure so as to become more competitive with other producers.

Pittsburgh — Carnegie-Illinois Steel Corp. raised the price of ferromanganese $10.75 to $151 per gross ton (including 50 cents switching charge), effective Oct. 1. The new price is for 78 to 82 per cent grade in carlots this city. Former price of $140.25 included a 75 cents switching charge.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 218

Seattle — Reinforcing bar mills are operating at capacity, but heavy backlogs remain static. Much new work is pending and a large volume of small orders, less than 100 tons each, is being placed. In some instances contractors find difficulty in placing their business while mills are hard pressed to make deliveries on time.

Scrap . . .

Stronger undertone develops in steelmaking grades despite light buying

Scrap Prices, Page 224

Boston — For top quality heavy melting steel scrap, prices range from $2 to $3 over the general run of material, most of which is moving between $31 and $32, shipping point. Bids on last quarter accumulations at the Boston Navy Yard reflect this premium, top price for No. 2 being $33.05, with prices for other grades in line. For yard scrap the price is lower within the range indicated above. A Pennsylvania interest bid $29.60 gross ton on cars for Navy yard unprepared, estimated at 000 tons for the period. Lighter steel scrap grades are for the most part unchanged. Demand for cast has slackened with inventories of most of the larger consumers the largest of the postwar period.

New York—Lipsett Inc., 80 Wall St., this city, was high with a bid of $381,600 on the battleship New Mexico, one of three battleships now up for scrapping through the United States Navy disposal office, this city. These ships will provide about 75,000 tons of saleable scrap. Offerings for the other two ships will be opened Oct. 27.

While brokers are still offering $32, fob shipping point for the principal steelmaking grades, the market is strong, with some trade interests looking for an increase in the near future. Most steel scrap at present is moving into eastern Pennsylvania as most Pittsburgh consumer offerings are not fully competitive.

Machine shop turnings are higher at $26 to $26.50 while short shovel turnings have advanced to a range of $28 to $28.50. Cast grades are strong but unchanged.

Philadelphia — While buying is still limited, steelmaking grades of scrap reflect a stronger undertone with delivered prices edging upward to a flat $37 on the principal grades and to $35 on No. 3 bundles. Still higher prices are reported in scattered instances. Machine shop turnings and mixed borings and turnings are higher at $30.50 to $31.50, delivered; bar crops and plate, punchings and plate, and cut structurals, $43 to $44. Electric furnace bundles also are higher at $41 to $42. Certain cast grades advanced last week, with No. 1 cupola cast at $46 to $48.50, delivered; unstripped motor blocks, $42.50 to $43.50; clean auto cast, $47.50 to $48.50; and No. 1 wheels, $47 to $48.

Pittsburgh—Leading scrap interests continue to bide their time, with new buying held to relatively small lots. Considerable tonnage, however, is moving under customer negotiated basis. It is questionable how long the mills can remain out of the open market, although some contend they are still accumulating some scrap on shipments from customers and on old orders from brokers and dealers. There appears to be a concerted effort to force prices lower. Whether this can be accomplished depends to a large extent on supply prospects throughout the winter months. Collection and segregation efforts among many dealers is said to have eased considerably, an important factor in the immediate supply outlook. Cast scrap supply is still very tight, with prices strong at recent high levels. No change occurred last week in price levels for open hearth grades, turnings and railroad scrap items.

Chicago — Scrap prices again held unchanged last week, with open-hearth material pegged at $39 a ton delivered in the absence of volume buying. With old orders placed at higher prices fairly well cleaned up, the situation is one in which prices might rise suddenly should mills seek tonnage in a big way. Buyers and sellers alike appear conscious of the delicate balance and seem anxious to avoid upsetting it. Mills hold to their offering of $39 for small tonnages, and brokers are not inclined to consummate long-term commitments. A fair amount of scrap is moving to mills, whose inventories are in the neighborhood of two months' needs. This is a smaller inventory than steelmakers normally like to carry at the start of a winter season.

Buffalo — While the stalemate continues in leading steelmaking grades of scrap, a test of the market is expected soon as fresh sales of turnings were reported with quoted ranges up $1 a ton. Machine shop turnings and borings moved to $30.50-31.50 a ton; short shovelings to $31.50-32.50 and to as high as $34 at Niagara Falls, N. Y.

Dealers report that additional bids are available at the prevailing range of $37 to $38 a ton for No. 2 heavy melting and bundles. Dealers are reluctant now to accept new orders at these levels. The range on No. 1 heavy melting also continues unchanged at $39 to $40 with premium offerings in limited lots reported up to $42. There is some talk that mills will oppose further reciprocal deals if the party receiving the steel must go to a scrap dealer to cover his end of the transaction. In some instances, dealers are reported obtaining prices considerably above quoted ranges. Fear is expressed that these prices will have a bearing on scrap prices in the open market which would boomerang on the mills.

Cleveland—Scrap prices held steady here last week on the basis of $38 to $38.50 for heavy melting steel. Mill buying was practically at a standstill, despite the fact that shipments have declined considerably during the last two weeks. Slowness of the market is attributed to the actual shortage of material following heavy shipments during the summer months at high prices. Some mills are believed to be drawing on reserve stocks which were built up to a fair volume early in September. Other mills claim that incoming shipments about balance consumption. Heavy foundry demand for scrap maintains a strong undertone for cast grades.

Detroit — Scrap market remains status quo, with mills paying the same price as that prevailing last month. Attempts to force the open-market price down $3 a ton apparently have been abandoned, although the tenor of most mills is that they are more comfortably fixed as to scrap stocks. "Conversion" deals on ingots are still prevalent, and one authoritative report is that an electric furnace plant charged something over $39 a ton

on top of the scrap price for a recent ingot tonnage.

Cast scrap is noticeably stronger, although prices are holding. There is no differentiation between No. 1 and No. 2 bundles in this area, although where material contains a considerable quantity of galvanized, it goes as No. 3 bundles, and $2 off the current price of $34.50-$35.00.

Cincinnati — Scrap prices were unchanged last week with shipments against old orders predominant. There is some evidence that dealers are withholding tonnage in anticipation of higher prices developing when adverse weather slows collections. Market interests consider the undertone strong despite disposition of melters to shun new ordering at any price advance. Melters' inventories are in fair volume.

Birmingham — Scrap continues to move in relatively satisfactory volume in this district. Some confusion is evident over price structures, but brokers and scrap yards declare there has been no change in posted prices in two weeks. Considerable tonnage is reportedly moving at prices above published quotations. Cast grades are reported scarce generally while heavy melting is in considerably better supply.

Seattle — Steel mills are receiving sufficient steel scrap to sustain operations, but shipments are inadequate to replenish stockpiles. Ship-breaking plants are furnishing an increasing tonnage and this source of supply is expected to improve as the government releases additional surplus ships. The price is firm at $22 gross ton, fob plant.

Rails, Cars . . .

Track Material Prices, Page 219

Washington — Number of freight cars on order by all railroads and carlines declined slightly during August, according to the Association of American Railroads. The number on order Sept. 1 was 114,230 against 118,117 on Aug. 1.

Orders by Class 1 railroads and railroad-owned refrigerator companies showed a slight increase during the month, however, going from 102,998 on Aug. 1 to 105,261 on Sept. 1. This compares with 50,169 on order Sept. 1, 1946.

Class 1 roads and railroad-owned refrigerator companies placed 5216 new freight cars in service during August. They retired 6535 in the same month. In the first eight months of this year, 31,390 new freight cars were installed and 38,726 retired.

Class 1 railroads also put 535 new locomotives in service in the first eight months against 322 in the like 1946 period.

Republic Leases Four Coal Mines from Consolidation

Pittsburgh — Republic Steel Corp. has leased from Pittsburgh Consolidation Coal Co. the following coal properties: Banning No. 1 mine, the abandoned Banning No. 3 mine, the abandoned Youghiogheny Slope mine, and the abandoned Waverly mine. These properties are for the most part in Westmoreland county, Pa., and contain some untapped reserves of metallurgical coal.

Warehouse . . .

Warehouse Prices, Page 221

Cleveland — Reductions in mill allocations to warehouses this quarter will affect only slightly the amount of steel actually received. The action is regarded as an attempt by mills to get on a current basis with respect to order books by blanking out certain months in the quarter. October receipts are expected to be about on a par with those of September, although that month's supply was lower than had been anticipated.

Warehousemen are particularly bitter about offers they receive constantly from gray marketers of scarce steel products at prices often close to three times the warehouse quotation. One distributor cited the recent business-like letter from a Pittsburgh firm offering him 3120 tons of 18 gage hot-rolled sheets at $225 a ton to be shipped in 260-ton lots over the coming year. This material, in his opinion, consists of mill ends which normally would be sold at about 80 per cent of the warehouse price.

Although demand is holding up at levels far in excess of supply in the flat-rolled carbon products, easing has been noted in cold-drawn items. Some price concessions are being made on stainless and alloy items, which are in easy position. The full mill price advance in some cases is not being charged, it is said, in order to stimulate demand.

Pittsburgh — Despite relatively good mill delivery (well above prewar volume), steel distributors' inventories of plates, shapes, sheets and strip, standard pipe, small carbon bars and wire items remain unbalanced and nearly depleted, due to unprecedented peacetime demand. Steel items in adequate supply include all alloys and stainless (except cold-rolled strip), tool steels, cold finished bars and large carbon bars. Inadequate inventory position of warehouse steel customers is reflected in the fact many are operating well below capacity. Frequently mill shipments for warehouse account are diverted directly to consumers. Many mill customers have turned to warehouses to supplement their inventories, but under present warehouse rationing policies for most steel items, bulk of this demand is not being satisfied.

With few exceptions, steel distributors do not expect much revision this quarter in monthly steel receipts, despite lower mill quotas. Orders formerly scheduled for November and December, which months are in some cases being blocked out to clear up carryover tonnage, will be written off with lower tonnage receipts for the full year 1947 reduced accordingly.

New York — Volume of "free" flat-rolled carbon tonnage for distribution by warehouses through the remainder of this year and beyond will be small and far below demand. Reduced allocations in fourth quarter will follow sharp declines in shipments to most distributors in the third. In ordering

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WELDING TORCH W-45. Strong and sturdy, 14 inches long, yet light in weight—only 17 ounces. Has lock control for continuous welding. Cuts oxygen and acetylene cost ⅓.

BLOWPIPE C-46. Has good balance . . . Comfortable grip . . . Closed hand releases gas . . . Open hand cuts it off . . . Reduces idle flame fire hazard . . . Works perfectly with natural gas, manufactured gas, butane and compressed air.

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WELDIT automatics are daily cutting costs, reducing fire hazards in many of the world's largest industrial plants. Some distributor territory still available. Write today for free descriptive bulletin.

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against smaller quotas warehouses specify a substantial portion against consumer backlog commitments, leaving a meager volume of sheets available for miscellaneous requirements. In some cases receipts of black sheets during the last six months of the year will be down to one-fourth of expected tonnage. While attempting to meet regular warehouse buyers' requirements first, this is impossible with the current inventory situation and there is every indication this condition will continue well into next year or longer.

Boston — Warehouse-dependent users of sheet steel are critically short of material in numerous instances and pressure on distributors is further increased by heavy demands from consumers normally buying the major part of requirements from mills. Most buyers in the latter group are getting close to prewar tonnage through allocation, but current needs are now generally heavier and this higher volume is difficult to place. Warehouses with reduced quotas are in no position to meet the excess demand. Inventories are depleted with indications fourth quarter will bring no relief to the critical supply. Only stainless sheet supply balances demand.

Chicago — Warehouses report demand for most products is about as high as it has ever been. Their inventories are so limited and unbalanced they are unable to fulfill customers' requirements. In the tightest category are sheets, strip and plates which are not provided by the mills in full ranges of types, gages and sizes, although receipts are holding fairly well. Smaller carbon bars supplies are almost as light. Products which are readily available are alloys, stainless and cold-drawn items.

Cincinnati — Steel jobbers so far have not received definite word on the tonnage of flat-rolled items they are to receive in the fourth quarter, but most of them are expecting cutbacks. Mill shipments of sheets and plates have slowed in the last few weeks. Reduced supply and insistent demand make the market as tight or tighter than at any time since 1939. Already the scarcity of sheets and plates has curtailed production, with a good share of the available tonnage going into repairs. Reduction in mill allotments generally will emphasize this trend.

Buffalo — Serious repercussions are expected among consumers of iron and steel warehouse items as a result of the 50 per cent slash in mill allotments in the closing quarter of the year. If the mills go through with their plans, the situation in hot-rolled and galvanized sheets will be even tighter than during the war. The further cutback becomes effective at a time when warehouses are already falling far short of filling commitments in flat-rolled products.

St. Louis — Steel consumers here are beginning to feel sharply the curtailment of some eastern mills' shipments to warehouses in this district. Warehouses normally buying from local mills have not been affected unduly, since St. Louis district mills have not adopted that policy. But manufacturers of consumer goods drawing supplies from warehouses with mill "parentage" are reporting reduced operations. One large warehouse, for example, had its shipments cut four weeks ago for the announced reason the mill wanted to clear its order slate by Jan. 1. Sharpest cutbacks were in hot and cold-rolled sheets and available supplies of these products are going to the manufacturers in direst need. The cutback already is hitting boiler and tank makers, body shops and electrical industries producing motors, household appliances and air conditioning equipment.

Seattle — Stable prices and a steady volume of orders are reported by jobbing houses. Demand for alloys has declined. Shops are not ordering stock materials in as heavy volume as during the war but are back to normal procedure of placing business as needed, deliveries from jobbers being faster. Sheets, nails, black and galvanized pipe are the critical items while 3/16 and 1/4-inch plates are in the same category. Substitutions are being made for sheets and 3/16-inch plates.

Canada . . .

Toronto, Ont. — Canadian iron and steel production for June was slightly below that for May, but was almost double that for July of last year when production was seriously affected by strikes at the basic steel plants.

Pig iron production for July maintained an average of 68.7 per cent of total rated capacity against 70 per cent for June. Of the 157,153 net tons of pig iron made in July 131,882 tons were basic iron of which 125,411 tons were for further use of producing companies and 6472 tons for sale; 20,338 tons of foundry iron of which 744 tons were for further use and 19,594 tons for sale; and 4932 tons of malleable, all for sale.

Output of steel ingots and castings in July was at an average rate of 78.6 per cent against 81 per cent in June. Production for the month included 226,443 tons of ingots and 5898 tons of steel castings.

Following are comparative production figures in net tons:

	Steel Ingots and Castings	Pig Iron	Ferro Alloys
July, 1947	232,314	157,153	12,402
June, 1947	238,297	159,826	16,212
July, 1946	135,914	64,472	6,243
7 mos., 1947....	1,715,622	1,130,306	90,152
7 mos., 1946....	1,585,553	940,495	75,234
7 mos., 1945....	1,824,779	1,092,350	114,422

California Expansions Total $700 Million in 2½ Years

Approximately 4650 new factories and major plant expansions have been announced, started or completed in California during the two and one-half year period ended June 30, 1947, with private capital investment of about $700 million, according to the California State Chamber of Commerce.

From 1939 through the first half of 1947, private capital investment in California manufacturing has exceeded the federal government's heavy wartime investments in California industries. Since 1939, government-financed manufacturing construction in the state totaled $1,006,000,000. In the same period, California's privately financed industrial expansion reached $1,175,000,000.

British Steel and Pig Iron Output Improves in August

British steel ingot output in August was at the annual rate of 12,178,000 tons, compared with the annual rate of 11,007,000 tons in July and 11,747,000 tons in August, 1946, according to the British Iron & Steel Federation. Production during the early part of the month was affected by holidays, but rose in each week until in the month's final week exceeded the rate of 13.5 million tons a year.

Improvement in pig iron output was also recorded in August, the federation noted, production being at the annual rate of 7,660,000 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

8175 tons, Midland power plant, Commonwealth Edison Co., Chicago, to American Bridge Co., Pittsburgh.

4700 tons, Municipal Hospital of Chronic Diseases, Welfare Island, New York, to American Bridge Co., Pittsburgh.

2300 tons, experimental station, E. I. du Pont de Nemours & Co., Wilmington, Del., to Bethlehem Fabricators Inc., Bethlehem, Pa.

300 tons, addition to telephone exchange, Tacoma, Wash., to Pacific Car & Foundry Co., Seattle.

250 tons, addition, Hotpoint Inc., Milwaukee, to Austin Co., Chicago.

175 tons, Bell Telephone Exchange, Vineland, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

Unstated, hydraulic structures, Grand Coulee dam, to Pacific Bridge Co., San Francisco.

STRUCTURAL STEEL PENDING

12,650 tons, Tennessee-Arkansas state bridge, Memphis, Tenn.; Harris Structural Steel Co., New York, low.

1700 tons, warehouse, Armstrong Cork Co., Lancaster, Pa.; bids close Oct. 15.

1300 tons, Electric Auto-Lite Co., Hazelton, Pa., on which bids have been closed and which company was recently erroneously referred to as being located in Philadelphia.

1200 tons, bridge, Spring Green, Wis., for state; Industrial Contracting Co., Minneapolis, low, general contract; bids Sept. 30.

700 tons, power house, Corn Products Refining Co., Argo, Ill.; Sargent & Lundy, Chicago, engineers.

605 tons, bridges, Magazine St., St. Charles St. and Central Railroad of New Jersey, Newark, N. J.; bids Oct. 21, State Highway Department, Trenton, N. J. Also required are 44 tons of wrought iron blast plates and 150 tons of reinforcing steel bars.

260 tons, steel truss span, Lewis county, Washington; awarded to Anderson Bridge Construction Co., Tacoma, low $286,291.

250 tons, Pennsylvania state bridge work, Washington county; bids closed Oct. 3.

225 tons, bridge, Douglas county, Wisconsin; Industrial Contracting Co., Minneapolis, low, general contract; bids Sept. 30.

211 tons, bridge, Warrenville, Ill., for state; bids Sept. 12 rejected.

150 tons, Pennsylvania state bridge, Juniata county; bids Oct. 10.

142 tons, bridge, Nilwood, Ill., for state; bids Sept. 12 rejected.

136 tons, Ozaukee county, Wis.; H. B. Janke,

L. B. FOSTER CO.

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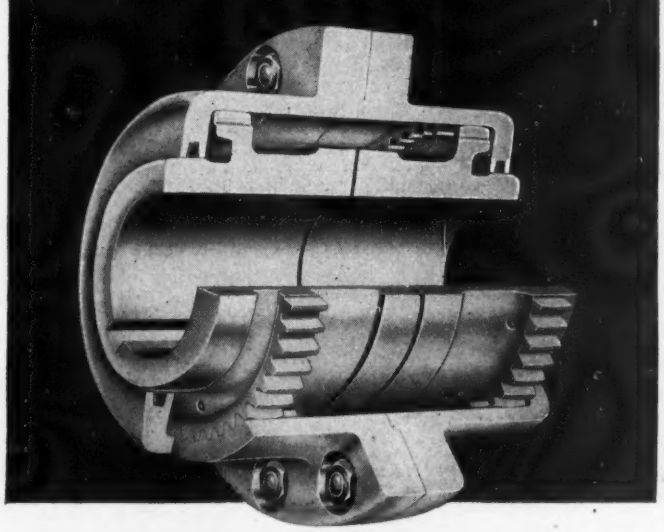

A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

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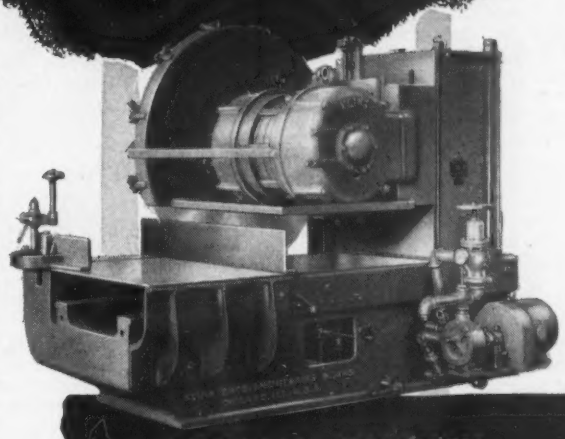
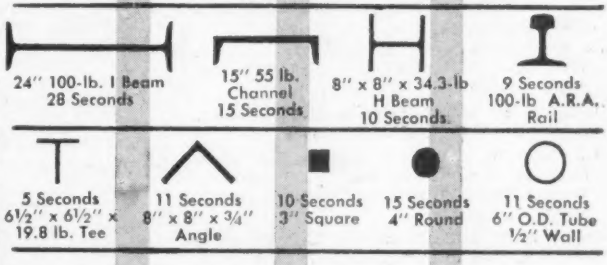


with **KLING** *HIGH SPEED FRICTION SAWS*


24" 100-lb. I Beam 28 Seconds
15" 55 lb. Channel 15 Seconds
8" x 8" x 34.3-lb H Beam 10 Seconds.
9 Seconds 100-lb A.R.A. Rail
5 Seconds 6½" x 6½" x 19.8 lb. Tee
11 Seconds 8" x 8" x ¾" Angle
10 Seconds 3" Square
15 Seconds 4" Round
11 Seconds 6" O.D. Tube ½" Wall

Friction sawing is one of few mechanical processes which employ the heat of friction in a useful manner. It concentrates heat on the material to be severed at a rate which is faster than it can absorb heat. The immediate temperature rise of the contact surface is so great that its strength is reduced considerably lower than that of the colder blade rim. This heated surface is readily removed by the blade and permits complete severing of the material rapidly with no loss of metal from the blade.

Because of its versatile ability to cut many varied structural shapes, as well as solid or hollow bars in any sequence, without change of blade or set-up, one machine can handle a volume of cutting that would otherwise require several separate shears or slow speed saws.

Consult Kling engineers regarding your metal cutting problems. State size of material to be cut. Bulletin No. 9200 giving full particulars and suggestions as to the type and size of saw will be mailed promptly. No obligation.

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low, general contract; bids Sept. 30.

80 tons or more, including reinforcing, Public Roads bridge Twisp river, Washington; bids to Portland Oct. 9.

REINFORCING BARS . . .

REINFORCING BARS PLACED

400 tons, refinery building, Cities Service Oil Co., East Chicago, Ind., to Olney J. Dean Steel Co., Chicago; Sumner S. Sollitt & Co., Chicago, contractor.

370 tons, store building, Red Owl Stores Inc., Fargo, N. D., to Ceco Steel Products Corp.; Omaha Standard Construction Co., Minneapolis, contractor.

200 tons, addition Olympia Brewery Co. plant, Olympia, Wash., to Northwest Steel Rolling Mills Inc., Seattle; A. G. Homan, contractor.

160 tons, commercial building, Seattle, to Bethlehem Pacific Coast Steel Co., Seattle; S. S. Mullen, contractor.

REINFORCING BARS PENDING

1530 tons, University of Washington medical-dental center, Seattle; Boespflug Construction Co., Seattle, low $1,731,932.

950 tons, flood protection, Channelton, Ind., for War Department; bids Oct. 21.

430 tons, tuberculosis hospital, Selah, Wash., General Construction Co., Seattle, general contract, low $1,726,280.

300 tons, school, Edina, Minn.; M. Schumacher Co., Minneapolis, low, general contract; bids Sept. 18.

271 tons, Natural Resources building, University of Illinois, Urbana; bids Sept. 30.

104 tons, substructure, Stage 1, North State St., viaduct, Department of Public Works, Chicago; bids Oct. 2.

100 tons, state girder bridge, Skagit county, Washington; contract to Clark Eldridge, Seattle, low $38,947.

Unstated, $2 million administration building, Bow Lake airport, Seattle; bids in.

Unstated, 160 x 460-foot factory and warehouse for Bemis Paper Bag Co., Vancouver, Wash.; Ross B. Hammond, Portland, Oreg., general contractor.

Unstated, $1 million addition Eastern State hospital; bids to Olympia, Wash., Oct. 22.

Unstated, $2½ million male ward addition Steilacoom state hospital; bids in to Olympia, Wash.

PLATES . . .

PLATES PENDING

3630 tons, straight web steel sheet piling and tee-section, for McNary dam, Cofferdam, Oregon; bids to U. S. engineer, Portland, Oreg., Oct. 20.

PIPE . . .

CAST IRON PIPE PLACED

550 tons, 8 and 12 inch, Seattle local improvements, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Union Pacific, five 2000-horsepower Diesel locomotives, to Fairbanks, Morse & Co., Chicago.

RAILROAD CARS PLACED

Norfolk & Southern, 250 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Wheeling & Lake Erie, 1000 seventy-ton hopper cars, to Ralston Steel Car Co., Columbus, O.

RAILROAD CARS PENDING

Atchison, Topeka & Santa Fe, 1150 cars, comprising 750 seventy-ton drop-end gondolas, 200 seventy-ton covered hopper cars and 200 seventy-ton triple hopper cars.

Union Pacific, 2500 cars, comprising 1500 seventy-ton hopper cars, 500 seventy-ton gondolas and 500 fifty-ton gondolas.

Western Maryland, 500 to 750 hopper cars.

CONSTRUCTION AND ENTERPRISE

CONNECTICUT

BRIDGEPORT, CONN.—Sikorsky Aircraft Division, United Aircraft Corp., South Ave., plans to build a $55,000 test and observation plant. Architects are Burns & Roe, 233 Broadway, New York.

BRISTOL, CONN.—Wallace Barnes Division, Associated Spring Co., 30 Main St., has awarded a $2 million contract to Turner Construction Co., 38 Newbury St., Boston, for the erection of a plant.

KANSAS

KANSAS CITY, KANS.—Phillips Petroleum Co., Bartlesville, Okla., has awarded a $500,000 contract to Winn-Senter Construction Co., Railway Exchange, for the erection of a 2-story plant here. Architect is C. W. Hubbell, c/o owner.

KENTUCKY

LOUISVILLE, KY.—Mason Paint Co., 729 Roseland St., has awarded a $130,000 contract to L. V. Abbott, 323 S. Broad Ct., for construction of a plant.

MASSACHUSETTS

NEWTON, MASS.—Industrial Center Trust has contracted with H. K. Ferguson Co., New York, for the designing of a $4 million industrial center development here. Project will provide manufacturing space for small industrial firms.

WILLIAMSETT, MASS.—A. G. Spalding & Bros. is starting construction on its $2 million plant here. John W. Harris Associates, New York, are the contractors, and plans were prepared by Lathrop Douglass, architect, and Guy B. Panero, engineer, 420 Lexington Ave., New York.

NEW YORK

BEACON, N. Y.—Durisol Inc., 420 Lexington Ave., New York, has awarded a contract to Skinner, Cook & Babcock, 60 E. 42nd St., for the construction of a $500,000 factory addition

JAMESTOWN, N. Y.—Art Metal Construction Co. plans to build a $108,000 facility.

PORT JEFFERSON, N. Y. — Long Island Lighting Co., 250 Old Country Rd., Mineola, plans to build a $3,875,000 generating station. Engineer is Ebasco Services Inc., 2 Rector St., New York.

NORTH CAROLINA

BURLINGTON, N. C.—Womack Electric Supply Co. has been incorporated by Charles A. Womack with a capital stock of $100,000.

CHARLOTTE, N. C.—Dunway Electric & Mfg. Corp. has been formed by W. Marvin Dunway with a capital of $100,000 to sell electrical equipment.

WINSTON-SALEM, N. C.—Hauser-Joyce Implement Co. Inc. has been incorporated by E. M. Hauser and associates with a capital of $100,000 to deal in farm machinery and equipment.

OHIO

ASHTABULA, O.—Electro Metallurgical Co. plans to build a $1 million power plant here adjoining its Lake Erie facility. Engineer is Ford, Bacon, Davis Co., 39 Broadway, New York.

CLEVELAND—Industrial Rayon Corp. is installing a fumes control unit at its plant at W. 98th St. and Walford Ave. Cost is estimated at $100,000.

GENEVA, O.—Geneva Metal Wheel Co., H. A. Carter, president, is building a $100,000 warehouse facility.

OREGON

PORTLAND, OREG.—Continental Can Co., 100 E. 42nd St., New York, will spend $2 million on a proposed plant here. Consulting engineers are A. Stoyanov Engineers, 8135 N.E. Union Ave.

PORTLAND, OREG.—Portland Bag & Metal Co. has awarded a contract for the first unit of a $500,000 expansion project to Bingham Construction Co. Site is 24 acres at 24th and Nicholai Sts.

RHODE ISLAND

KINGSTON, R. I.—Gazda Engineering Co., 1712 Independent Trust Bldg., Providence, plans to build a 1-story factory here, at a cost of $225,000.

TENNESSEE

CHATTANOOGA, TENN—E. I. du Pont de Nemours & Co., Wilmington, Del., is completing work on its nylon plant here. Facility is being built with 1500 tons of fabricated steel from Ingalls Iron Works Co., Birmingham.

NASHVILLE, TENN.—Ferro Enamel Corp., 20 Culver St., plans to build a $100,000 clay process plant here.

UTAH

SALT LAKE CITY, UTAH—Union Pacific Railroad, W. C. Perkins, chief engineer, Omaha, Neb., has awarded a $100,000 contract to Paul Paulsen Construction Co., 1425 Jefferson St., for the erection of a control tower in the Salt Lake City yards.

VIRGINIA

NEWPORT NEWS, VA.—Asheville Mica Co. has received a low bid of $171,400 from Virginia Engineering Co., 80 29th St., for the construction of factory and administration buildings. Architects are Williams, Colle & Pipino.

SALEM, VA.—Yale & Towne Mfg. Co. has selected a site here for a proposed plant.

WYOMING

BIG HORN RIVER, WYO.—Department of Interior has awarded a $13,900,000 contract to Morrison-Knudsen Co., Boise, Idaho, for construction of the Boysen Dam on the Big Horn river in north-central Wyoming.

CANADA

EDMONTON, ALTA.—Canadian Liquid Air Co. Ltd. has awarded a contract to Bennett & White Construction Co. Ltd. for the erection of a $405,000 acetylene plant and factory addition. Architect is J. C. Hope.

BELLEVILLE, ONT.—Bakelite Co. (Canada) Ltd., 163 Dufferin St., Toronto, plans to build a plant here.

FT. WILLIAM, ONT.—Canadian Fairbanks-Morse Co. Ltd., 106 Simpson St., has awarded a $75,000 contract to Stead & Lindstrom, 259 College St., Port Arthur, for the construction of a 1-story warehouse and office. Architect is H. M. Scott, 265 Cuthbertson Block.

SARNIA, ONT.—Sarnia Bridge Co. Ltd., 251 Campbell St., plans to build an $80,000 plant.

SARNIA, ONT.—Canadian Printing Co., 229 Front St., has awarded a $75,000 contract to Giffen Contracting Co., Colonial Hotel Bldg., for the construction of a 1-story plant.

TORONTO, ONT.—J. C. Eno (Canada) Ltd., 296 Richmond St., has awarded a $70,000 contract to E. S. Martin, 16 Saulter St., for the construction of a 4-story warehouse and factory addition. Architects are M. Brown & Elton, Confederation Life Bldg.

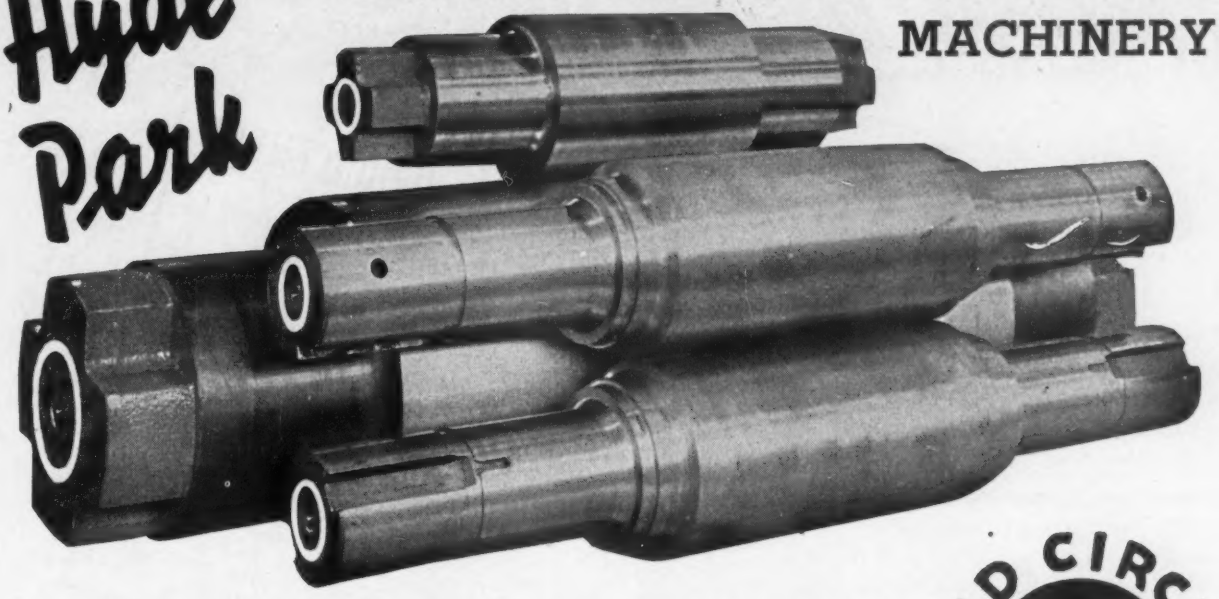
TORONTO, ONT.—Pilkington Glass Co. Ltd., 19 Mercer St., has awarded a $250,000 contract to A. W. Robertson Ltd., 57 Bloor St. W., for the construction of a 1-story plant addition and alterations. Plans are by Allward & Gauinlock, 57 Bloor St. W.

GATINEAU MILLS, QUE.—Commercial Alcohols Ltd., Montreal, will build a $750,000 plant here.

MAGDELAN ISLAND, QUE.—Quebec Manganese Mines Ltd. will spend $150,000 on a manganese deposit development. Engineer is J. W. Storer, c/o owner.

Hyde Park

CHILLED ROLLS and ROLLING MILL MACHINERY



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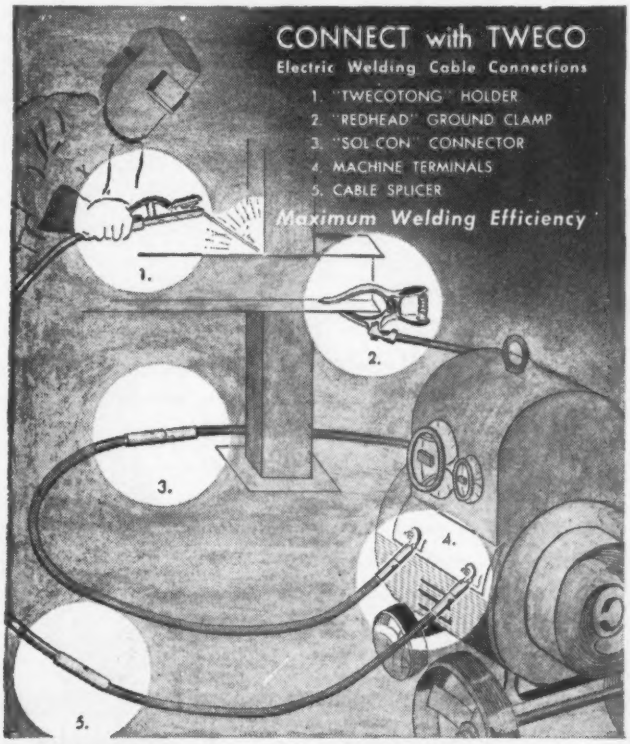

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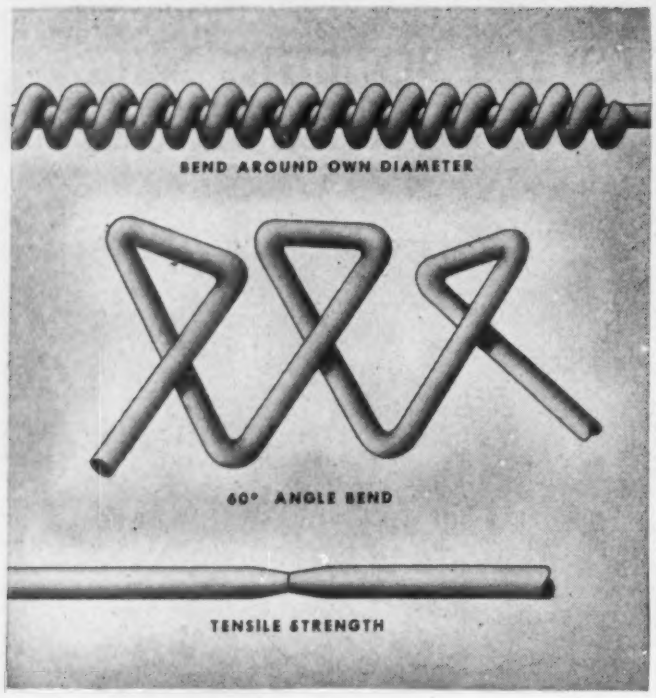

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takes over
KNU-VISE, INC.
AND AIROP, INC.
and will manufacture under the one name
KNU-VISE PRODUCTS
all devices formerly made by these two companies—Knu-Vise Toggle-Action Clamps and Pliers, Vise-Wrenches, and Airop (air-operated clamping control.)
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$$(2\tfrac{7}{16} \times 7) \times (4\tfrac{7}{8} \times 3\tfrac{5}{16}) =$$

$$17\tfrac{1}{16} \times \left(\tfrac{39}{8} \times \tfrac{53}{16}\right) = 17\tfrac{1}{16} \times \tfrac{2067}{128}$$

$$17\tfrac{1}{16} \times 16\tfrac{19}{128} = \tfrac{273}{\cancel{16}\,1} \times \tfrac{\cancel{2048}^{\,128}}{\cancel{128}\,1} = \cancel{275}$$

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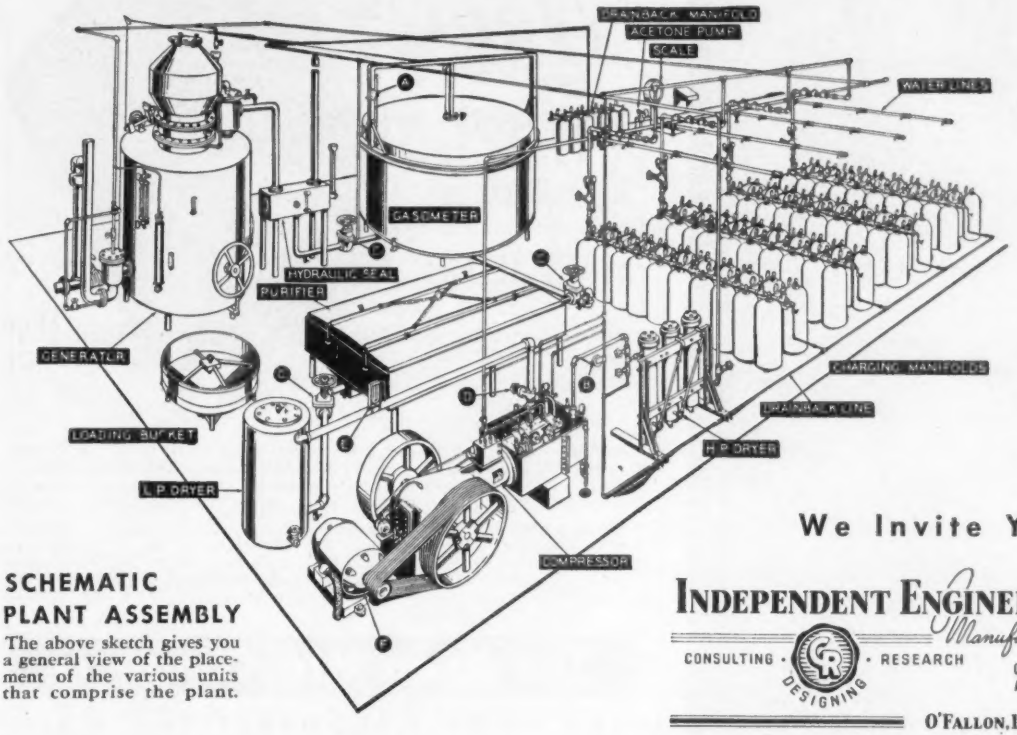

SCHEMATIC PLANT ASSEMBLY

The above sketch gives you a general view of the placement of the various units that comprise the plant.

For the Prospective Gas Manufacturer this complete plant layout provides for extremely *simple* operation and exceptionally *low* maintenance costs.

The entire plant is designed to provide ample storage room for filled tanks and compact enough for the Chief operator to observe all operations. Rated capacity, 2700 cu. ft. per hour.

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Manufacturers of

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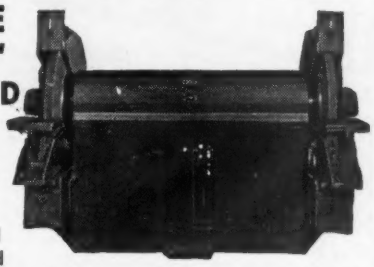
2 POWERFUL MARSCHKES

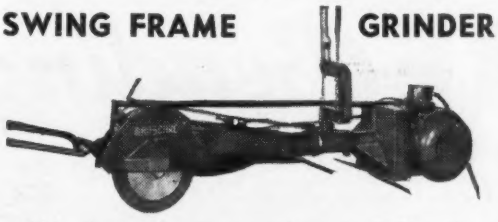
designed to cut your grinding costs

MARSCHKE "Vari-Speed" FLOOR STAND GRINDER



Massive, well-designed construction, combined with dependable automatic spindle speed control, makes this powerful machine the most efficient heavy duty floorstand grinder made.

MARSCHKE "Heavy Duty" SWING FRAME GRINDER



This machine, famous for its convenience in "taking the wheel to the work", is as efficient as it is powerful and dependable.

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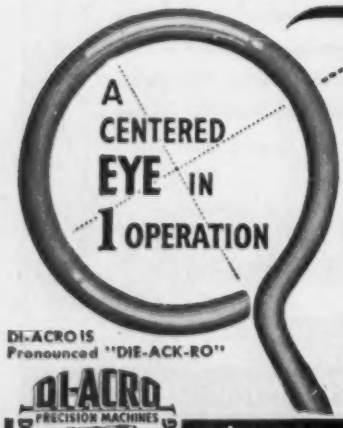

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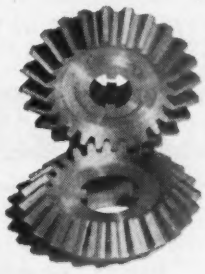

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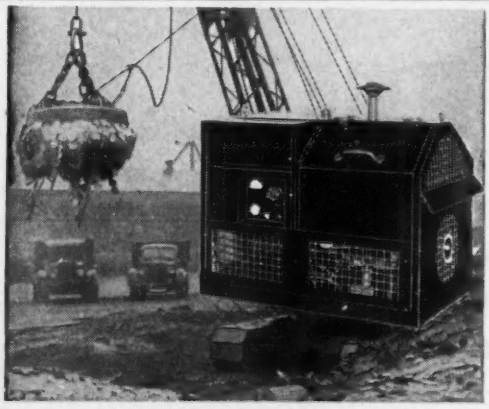

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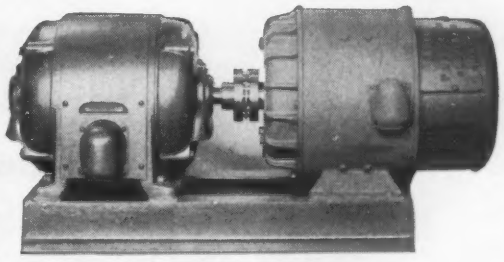

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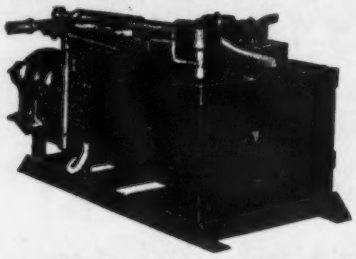

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Write for catalog of our complete line of reinforcing bar benders.

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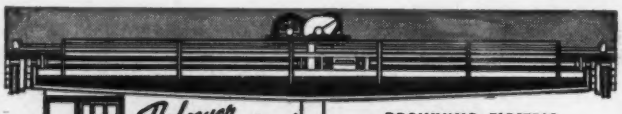

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Capacity 7/16" hole through 1/4" metal

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5/16"x3/16"	1/2"x3/16"	1/2"x7/32"	5/16"x1/4"	21/64"	7/32"
1/4"x3/16"	1/2"x5/32"	1/2"x3/16"	5/16"x9/64"	5/16"	3/16"
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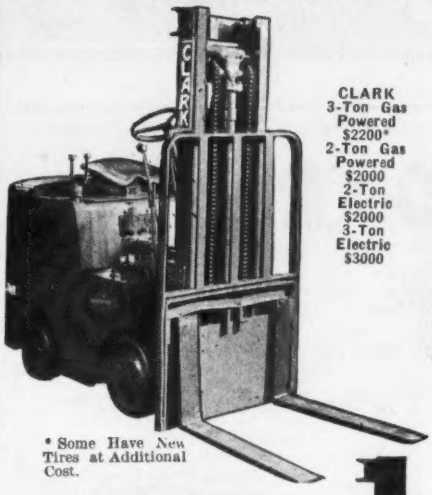

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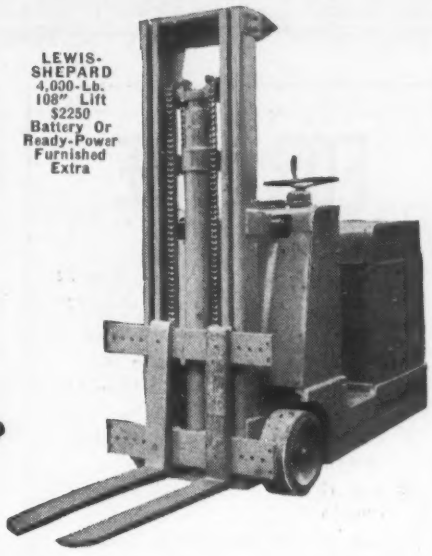

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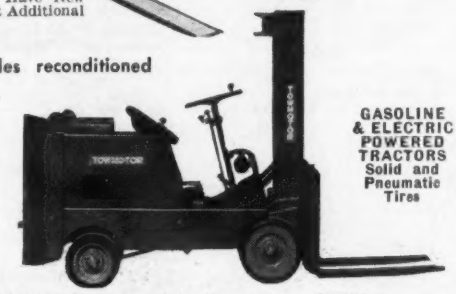

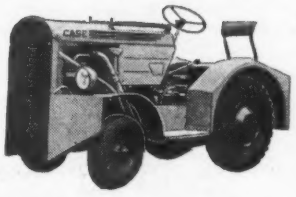

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68 pcs. ¾ x 12" U M Plates 20 to 21'
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50 tons ⅜" Plate Ends large sizes
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P&H 42'1½" Span

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Crane 47'3" Span
Crane 76' Span
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P&H 72'1" Span
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7½-TON
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8-TON
P&H 80' Span

10-TON
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P&H 87'6" Span
Shaw 80'9" Span
Alliance 58'5" Span
Lane 50' Span

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Outdoor Crane 57'5½" Span
Alliance 48'9½" Span
New Albany 50'6" Span
Morgan 82' Span
Northern 76' Span
P&H 40' Span
Whiting 38' Span

20-TON
Overhead Crane 60' Span
Whiting 48'6" Span
Whiting 75' Span
Shepard Niles 48'6" Span
P&H 51'4" Span
P&H 37' Span

25-TON
Alliance 38'2" Span
Bedford 67'8" Span
Case 63' Span
Overhead Crane 74'4" Span
P&H 80' Span

30-TON
Morgan 55' Span
Northern 75' Span

35-TON
Overhead Crane 74'4" Span

40-TON
Niles 151'9½" Span

50-TON
Alliance 52' Span
Morgan 50' Span

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ADVERTISING INDEX

A

Acme Machine Tool Co., The 37
Advance Foundry Co., The 202
Aetna-Standard Engineering Co., The ..... Inside Back Cover
Air Reduction 51
Ajax Electrothermic Corp. 201
Allen-Bradley Co. 181, 182
Allen Mfg. Co., The 236
Alliance Machine Co., The 210
Allis-Chalmers Mfg. Co. ..Inside Front Cover
Aluminum Company of America 26
American Brake Shoe Co., National Bearing Division 9
American Chain & Cable, Page Steel & Wire Division 132
American Crayon Co., The 198
American Gas Furnace Co. 191
American Institute of Bolt, Nut & Rivet Manufacturers 122, 123
American MonoRail Co., The 79
American Shear Knife Co. 192
American Society for Metals 14
American Solder & Flux Co. 239
Ampco Metal, Inc. 168
Arcos Corporation 203
Automatic Transportation Co. 133

B

Baker & Adamson Division, General Chemical Co. 36
Barnes, Wallace, Co., Division of The Associated Spring Corp. 25
Bay City Forge Co. 236
Bay State Abrasive Products Co. 19
Beatty Machine & Mfg. Co. 156
Belmont Iron Works 238
Bethlehem Steel Co. 1
Bixby, R. W., Inc. 246
Blaw-Knox Co., Lewis Foundry & Machine Division 21
Bliss & Laughlin, Inc. 157
Boston Woven Hose & Rubber Co. 41
Brandt, Charles T., Inc. 207
Bridgeport Brass Co. 163, 164
Bristol Co., The 22, 23
Brown & Sharpe Mfg. Co. 13
Browning, Victor R., & Co., Inc. 238

C

Carboloy Co., Inc. 113
Carnegie-Illinois Steel Corporation 130
Ceilcote Co., The 238
Century Electric Co. 131
Chambersburg Engineering Co. 54
Champion Machine & Forging Co., The 195
Chicago Perforating Co. 239
Cimcool Division of The Cincinnati Milling Machine Co. 175
Cincinnati Milling Machine Co., The, Cimcool Division 175
Clark Equipment Co., Tructractor Division 138
Cleco Division of The Reed Roller Bit Co. 38
Cleveland Crane & Engineering Co., The .. 167
Cleveland Punch & Shear Works Co., The 8
Cleveland Twist Drill Co., The 197
Climax Molybdenum Co. 84
Columbia Steel Co. 130
Continental Foundry & Machine Co. 53
Copperweld Steel Co. 115
C-O-Two Fire Equipment Co. 170
Coulter, James, Machine Co., The 237
Cowles Tool Co. 237
Crocker-Wheeler Electric Manufacturing Co., A Division of The Joshua Hendy Corporation 187
Cuyahoga Spring Co., The 183

D

De Laval Steam Turbine Co. 18
Differential Steel Car Co. 238
Dulien Steel Products, Inc. 245

E

Economy Co., Inc. 244
Edison Storage Battery Division of Thomas A. Edison, Inc. 199
Elastic Stop Nut Corporation of America .. 55
Electric Furnace Co., The 189
Electro Metallurgical Co. 39
Enterprise Galvanizing Co. 239
Erdle Perforating Co., The 236
Etna Machine Co., The 185
Eureka Fire Brick Works 238

F

Falk Corporation, The 160, 161
Farrel-Birmingham Co., Inc. 146
Fitzsimons Steel Co., The 44
Foote-Burt Co., The 49
Foster, L. B., Co. 231, 242, 245
Frank, M. K. 245
Fuller Brush Co., The 227

G

Gas Machinery Co., The 154
Gates Rubber Co., The 42
General Chemical Co., Baker & Adamson Division 36
Gerding Bros. 247
Globe Brick Co., The 180
Goodrich, B. F., Co., The 3

H

Handy & Harman 46
Harrington & King Perforating Co., The ... 194
Hassall, John, Inc. 119
Heil Process Equipment Co. 238
Hendrick Manufacturing Co. 200
Homestead Valve Mfg. Co. 34
Houghton, E. F., & Co. 10, 11
Hughes-Keenan Co., The 194
Hyde Park Foundry & Machine Co. 233

I

Ideal Industries, Inc. 209
Illinois Clay Products Co. 186
Independent Engineering Co., Inc. 235
Industrial Plants Corporation .241, 242, 243
Ingersoll-Rand 2
Ingersoll Steel Division, Borg-Warner Corporation 174
Inland Steel Co. 67

J

James, D. O., Manufacturing Co. 237
Jeffrey Manufacturing Co., The 158
Jira Thayer Jennings 246
Johnson Bronze Co. 50
Johnson Gas Appliance Co. 141

K

Kardong Brothers, Inc. 238
Kearney & Trecker Corporation 6, 7
Kennametal, Inc. 166
Keokuk Electro-Metals Co. 134
Kinnear Mfg. Co., The 198
Kline Iron & Metal Co. 243, 244
Kling Bros. Engineering Works 231
Knu-Vise Products 234

L

Laminated Shim Co., Inc. 172
Landis Machine Co. 15
Layne & Bowler, Inc. 206
Leschen, A., & Sons Rope Co. 233
Lewis Foundry & Machine Division of Blaw-Knox Co. 21
Lewthwaite, T. H., Machine Co., Inc. 239
Littell, F. J., Machine Co. 196
Lodge & Shipley Co., The 37
Logan Co., Inc. 148
Logan Platers, Inc. 235
Los Angeles Sheet Metal Mfg. Co. 241
Lukens Steel Co. 179
Luria Brothers & Co., Inc. 24

M

Master Products Co., The 208
Mathews Conveyer Co. 142
Michigan Steel Tube Products Co. 117
Micromatic Hone Corporation 16
Midvale Co., The 47
Midwest Steel Corporation 244
Miller & Co. 134
Moline Tool Co. 188
Molybdenum Corporation of America 177
Monarch Machine Tool Co., The 62
Monarch Steel Co. 44
Mount Clemens Metal Products Co. 143

N

National Acme Co., The 31
National Bearing Division, American Brake Shoe Co. 9
National Carbon Co., Inc. 125
National Metal Exposition 14
National Roll & Machine Co. 204
National Screw & Mfg. Co., The 120
National Steel Corporation 17
New Jersey Zinc Co., The 87

O

Ohio Galvanizing & Mfg. Co., The 239
Ohio Locomotive Crane Co., The 238
O'Neil-Irwin Mfg. Co. 236

P

Page Steel & Wire Division, American Chain & Cable 132
Pangborn Corporation 45
Parker Appliance Co., The 20
Penn Brass & Copper Co. 43
Pennsylvania Salt Manufacturing Co. 140
Pittsburgh Commercial Heat Treating Co. .. 239
Pittsburgh Gear & Machine Co. 239
Poole Foundry & Machine Co. 231
Power Plants, Inc. 237
Precision Scientific Co. 204
Pressed Steel Car Co., Inc. 190

R

Ransome Machinery Co. 209
Rapids-Standard Co., Inc., The 64
Ready-Power Co., The 144
Republic Steel Corporation 61
Revere Copper & Brass, Inc. 127, 128
Righter, Harry M., Inc. 243
Robinson Clay Product Co., The 60
Russell, Burdsall & Ward Bolt & Nut Co. 111
Ryerson, Joseph T., & Son, Inc. 68

S

Salem Engineering Co. 193
Sandvik Steel, Inc. 155
Schmieg Industries, Inc. 135
Scovill Manufacturing Co. 173
Seneca Wire & Manufacturing Co. 147
Seymour Manufacturing Co., The 58
Sharon Steel Corporation 5
Shreve, Anderson & Walker 151
Sibley Machine & Foundry Corp. 159
Silent Hoist & Crane Co. 188
Simonds Gear & Mfg. Co., The 238
Standard Pressed Steel Co. 12
Standard Tube Co., The 205
Strom Steel Ball Co. 202
Stuart, D. A., Oil Co., Ltd. 192
Sundstrand Machine Tool Co. 27
Superior Steel Corporation 145
Surface Combustion Corporation 32
Swindell-Dressler Corporation 57

T

Tennessee Coal, Iron & Railroad Co. 130
Thew Shovel Co., The 33
Timken Roller Bearing Co., The .. Front Cover
Timken Roller Bearing Co., The, Steel & Tube Division 136, 137
Tinnerman Products, Inc. 93
Tomkins-Johnson Co., The 162
Towmotor Corporation 165
Tri-Boro Steel Supply Co., Inc. 184
Tubular Service Corporation 238
Tweco Products Co. 233

U

Udylite Corporation, The 176
Union Carbide & Carbon Corporation ..39, 125
United Engineering & Foundry Co. 35
United States Rubber Co. 59
United States Steel Corp., Subsidiaries ..40, 130
United States Steel Export Co. 130
United States Steel Supply Co. 40

V

Vanadium Corporation of America 171
Van Dorn Electric Tool Co., The 139
Verson Allsteel Press Co. 28, 29
Victor Equipment Co. 52
Vonnegut Moulder Corporation 235

W

Warren City Manufacturing Co. 95
Wean Engineering Co., Inc., The .. Back Cover
Webb Corp., The 178
Weinman Pump & Supply Co., The 239
Weirton Steel Co. 17
Weldit, Inc. 229
Wells Manufacturing Corporation 169
Westinghouse Electric Corporation 152, 153
Wheeling Steel Corporation 237
Wheland Co., The 236
Wickwire Spencer Steel Division, The Colorado Fuel & Iron Corporation 234
Wisconsin Motor Corporation 200
Wolverine Tube Division, Calumet & Hecla Consolidated Copper Co. 48
Worcester Pressed Steel Co. 56
Worth Steel Co. 30
Wrought Washer Mfg. Co. 196
Wyckoff Steel Co. 149

Y

Youngstown Alloy Casting Corporation 150

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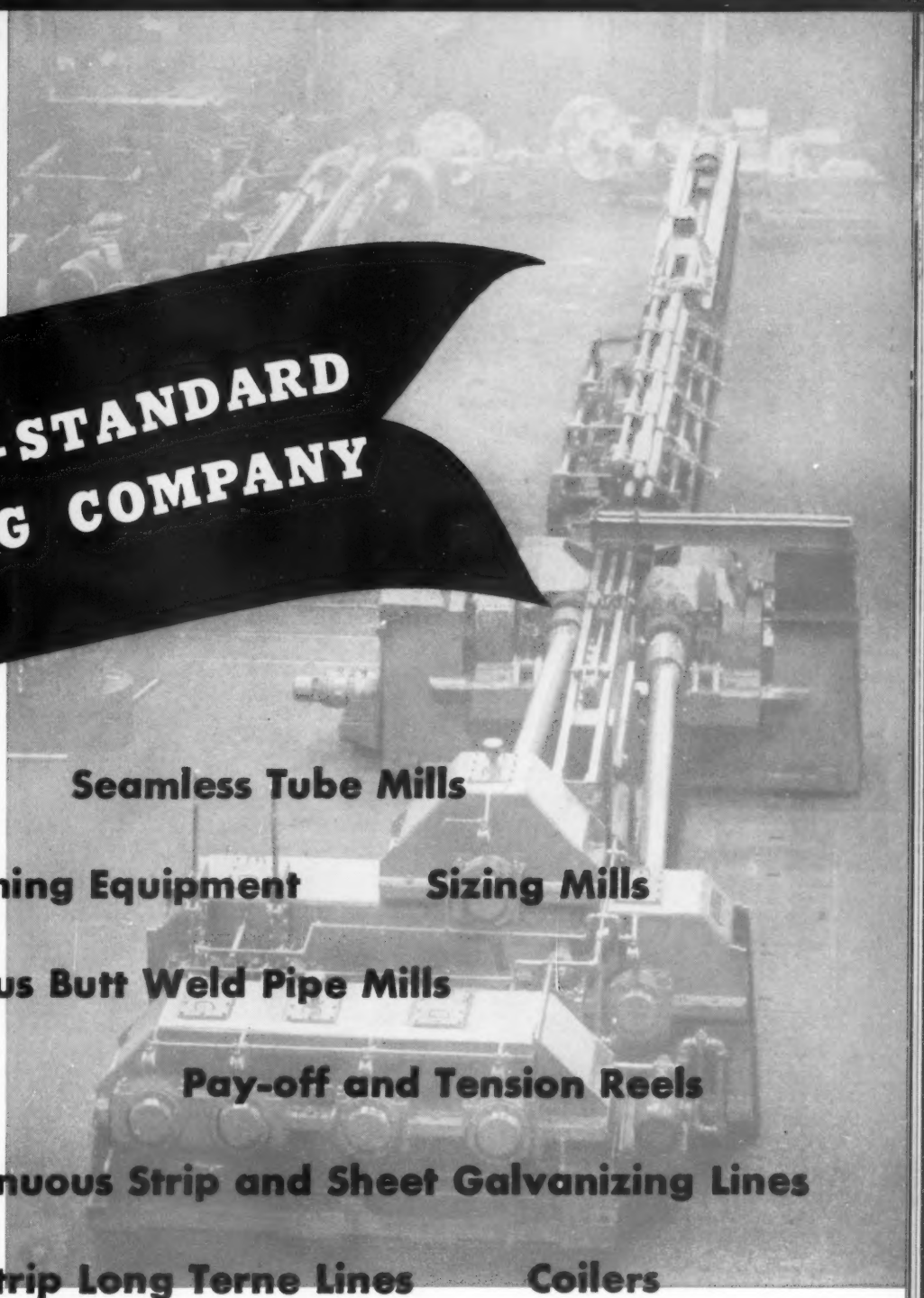
Classified Advertising Pages 241, 242, 143, 244, 245, 246, 247



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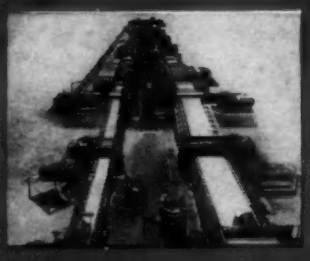
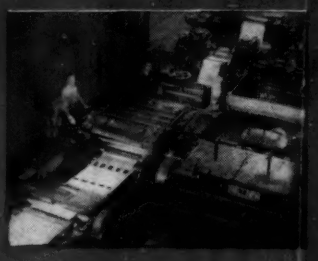
Annealing Furnaces

Mechanized Sheet Mill



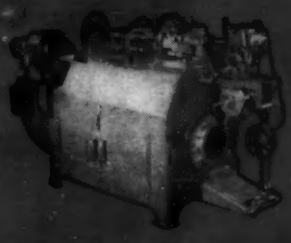
Pickle Line



Tin Plate Shearing

Electrolytic Line

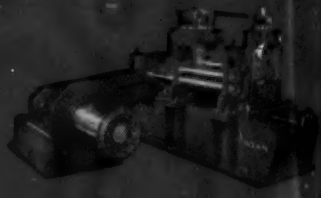
Backed Up Leveller For Wide Sheets



Barbed-Wire Fence Machine

No. 1155 Farm and Field Fence Machine

8 Block Fine Wire Tinning Take-up Frame



Strip Reel and Slitting Unit

HOLMQUIST BARBED WIRE AND WIRE FENCE MACHINERY

16 Block Wire Galvanizing Frame